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# Illinois Ozone Base Year Emission Inventory for 2017



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## List of Acronyms

AEDT	Aviation Environmental Design Tool
AER	Annual Emissions Report
AP-42	Compilation of Air Pollutant Emission Factors
APU	Auxiliary Power Unit
CAA	Clean Air Act Amendments of 1990
CAERS	Computerized Annual Emissions Reporting System
CNG	Compressed Natural Gas
CO	Carbon Monoxide
EDMS	Emissions and Dispersion Modeling System
ERTAC	Eastern Regional Technical Advisory Committee
FAA	Federal Aviation Administration
GIS	Geographic Information System
GVW	Gross Vehicle Weight
HPMS	Highway Performance Monitoring System
ICAO	International Civil Aviation Organization
ICEMAN	Integrated Comprehensive Environmental Management System
IDOT	Illinois Department of Transportation
ISSIS	Illinois EPA's Illinois' Stationary Source Inventory System
LADCO	Lake Michigan Air Directors Consortium
LPG	Liquefied Petroleum Gas
LTO	Landing and Takeoff Operation
MOVES	Motor Vehicle Emission Simulator
NAA	Nonattainment Area
NAICS	North American Industry Classification System
NO <sub>x</sub>	Oxides of Nitrogen
POTW	Publicly-owned Treatment Works
QA	Quality Assurance
QC	Quality Control
ROSS	Registration of Smaller Source Program
RVP	Reid Vapor Pressure
SCC	Source Classification Code
SIC	Standard Industrial Classification (code)
SIP	State Implementation Plan
TPD	Tons per Day
TPY	Tons per Year
TSDF	Hazardous Waste Treatment, Storage and Disposal Facility
USEPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOM	Volatile Organic Material
XML	Extensible Markup Language

## Executive Summary

This document provides the results of the Illinois Ozone Emission Inventory for 2017 and a general description of the methods used to calculate the emissions. This inventory uses the most up-to-date emission factors and calculation methodologies that were available at the time. The Illinois EPA is required to submit a complete emission inventory to USEPA every three years. A complete inventory includes point, area, and mobile (on-road and off-road) source categories. For an ozone inventory, daily and annual emissions of ozone precursors – nitrogen oxides (NO<sub>x</sub>) and volatile organic materials (VOM) – are required. The resulting data are separated into the two nonattainment areas (Chicago and Metro-East St. Louis) and the attainment area (the remainder of the State).

The ozone nonattainment areas (NAAs) referenced in this document are for the 2015 ozone standard and include:

### Chicago NAA

- Cook County
- DuPage County
- Grundy County (Aux Sable and Goose Lake Townships)
- Kane County
- Kendall County (Oswego Township)
- Lake County
- McHenry County
- Will County

### Metro-East NAA

- Madison County
- Monroe County
- St. Clair County

The primary source of data for point sources was the source-reported 2017 annual emissions reports (AERs). Area source emissions are typically estimated by multiplying an emission factor by a known indicator of activity (e.g., population) for a source category. On-road mobile source emissions were calculated using the MOVES2014a computer model. Off-road mobile source emissions were also calculated using the MOVES2014a model.

To ensure this inventory is of the highest quality, Illinois EPA implemented quality assurance (QA) procedures and quality control (QC) checks throughout the inventory development process. Illinois specifically followed the procedures outlined in USEPA's guidance documents pertaining to inventory quality assurance and believes the inventory to be complete, accurate, and of high quality.

# 1 Introduction

Every three years (e.g., 2008, 2011, 2014, etc.) the Illinois EPA conducts a full state-wide emissions inventory of ozone precursor emissions for all source categories (i.e., point, area, mobile). This document reflects the items included in the inventory plus the methodology used to calculate those emissions. Special emphasis is placed on the Chicago and Metro-East St. Louis (Metro-East) areas since they are designated as ozone NAAs.

The Chicago NAA includes the counties of Cook, DuPage, Grundy (Aux Sable and Goose Lake Townships), Kane, Kendall (Oswego Township), Lake, McHenry, and Will. The Metro-East NAA includes the counties of Madison, Monroe, and St. Clair.

The primary source of data for point sources was the source-reported 2017 AERs. Area source emissions are typically estimated by multiplying an emission factor by a known indicator of activity (e.g., population, employment, etc.) for a source category. Calculation of emissions for area sources primarily used 2017 activity levels and in a few cases projections from previous years were used. Area source calculation methodologies were updated to the most recent calculation methods identified by USEPA.

On-road mobile source emissions were estimated using the MOVES model (Version 2014a). Off-road emissions were also estimated using the MOVES model. The MOVES model does not include emission estimates for aircraft, locomotives, or commercial marine vessels. Aircraft emissions were calculated using actual activity data (operations) for each airport. Emissions from locomotives were calculated from data provided by USEPA. Commercial marine vessel emissions were grown from 2014.

To ensure this inventory is of the highest quality, Illinois EPA implemented QA procedures and QC checks throughout the inventory process. Illinois EPA specifically followed the procedures outlined in USEPA's guidance.



## **2 Emission Inventory Summaries**

### **2.1 Background**

Four basic steps were involved in the preparation of the emission inventory. The first step was planning. As required by USEPA guidance, Illinois EPA prepared an Inventory Preparation Plan (IPP). This plan outlined the methods by which the Illinois EPA would assemble the 2017 inventory and perform QA/QC checks. The QA/QC plans and procedures are presented in Section 6.0.

The second basic step was data collection. A major element in this step was to determine which source categories should be considered as point sources in the inventory and which should be considered area sources. Fundamentally different data collection procedures are used for these two source types. Actual emissions data reported in the AERs are used to collect point source data, whereas county level information such as population or employment is generally used to estimate area source emissions. The data collected and maintained on point sources is more detailed than area sources.

The third basic step in the inventory compilation effort involved analysis of data collected and the development of emission estimates for each source. Emissions were determined individually for each point source, whereas emissions were generally determined for the overall area source category. Reported emission data, material balances and emission factors were all used to make these estimates. Adjustments were made to the VOM inventory to reflect only reactive VOM.

The fourth step was reporting. Initially, Illinois EPA identified the kinds of data and formats that would be needed for this inventory document to fulfill USEPA inventory requirements. Later, Illinois EPA identified additional reports and features that would be useful for future inventory needs and/or modeling requirements. These have been incorporated into this document.

Demographic data characterizing the various counties in the state are crucial to many of the emission estimation calculation procedures used to develop the inventory for area source categories. Also, in a number of instances, emissions are dependent to some degree on the geographic location of the county. In such instances, Illinois EPA developed factors based on whether counties were either a “Northern” or “Southern” county.

## **2.2 Methodology**

A detailed emission inventory for a pollutant lists each source of that pollutant and the quantity of its emissions. The sources are usually categorized in two ways: (1) point, area, or mobile sources or (2) industrial categories and subcategories.

Emissions from point sources are defined as those whose emissions are usually fairly well characterized and are generally discharged through stacks and which are required to possess an Illinois EPA issued permit or register as a source in the Registration of Smaller Sources (ROSS) program. Fugitive emissions are not emitted from a discrete point but are emitted from numerous areas throughout a facility. Area sources are usually spread over wide areas with no distinct discharge points or are comprised of a large number of small point sources that are difficult to describe separately (e.g., the heating furnaces in individual homes) and whose emissions are not so well characterized. Other examples of area sources include architectural surface coating, automobile refueling, dry cleaning, and automobile refinishing. Mobile sources are divided into two major categories – on-road and off-road. On-road mobile sources include cars, trucks, buses, and motorcycles used for transportation of goods and passengers on roads and streets. Off-road mobile sources include other modes of powered transportation such as aircraft, locomotives, ships, and motor vehicles used off-highway. This classification protocol has been utilized throughout this document.

A typical industrial plant may have different source types associated with it. For example, a refinery with numerous industrial processes would itself be a point source; the leaks from valves, pumps, and fittings throughout the miles of piping would be a fugitive source; and the switch engine that moves tank cars on the railroad siding would be an off-road mobile source. Also, a plant may have more than one industrial classification associated with it. The refinery in the previous example is in one industrial category; its tank farm is in another. Quantities of emissions may be measured directly (at the stack); they may be calculated from engineering principles (e.g., mass balance); or they may be estimated (e.g., by assuming reasonable emission rates, times, etc.). Further, emissions can be expressed in terms of annual emissions, seasonal emissions, or daily emissions. In the case of the pollutant ozone, precursor emissions are generally expressed in terms of typical daily emissions representative of the peak ozone season, or tons per day.

Emission estimates presented in this report generally followed the methodologies outlined in USEPA's emission inventory preparation guidance document, Volumes I-IV, and USEPA's "Reporting Guidance for 1996 Periodic Emissions Inventories and National Emission Trends (NET) Inventories." Where different estimation methodologies were used, such methods are identified. The emission estimates were seasonally adjusted to reflect average daily emissions during the summer months, which are generally considered the peak ozone season. For point sources, emissions were taken from source submitted data for the peak ozone season, as reported in their 2017 AERs. Area source emissions were also modified using seasonal adjustment factors for the ozone season. Some sources have greater emissions on weekdays than

on weekends. Emissions from all such sources have been adjusted to take weekday/weekend differences into consideration.

The VOM emission estimates provided in this document are for those VOMs determined by USEPA to be photochemically reactive. All identified nonreactive VOMs were excluded from the VOM totals reported here for all sources and source categories. Compounds considered to be nonreactive and therefore not included in the inventory are listed below:

- Methane
- Ethane
- Methylene chloride
- 1,1,1-Trichloroethane (Methyl chloroform)
- Trichlorofluoromethane (CFC-11)
- Dichlorodifluoromethane (CFC-12)
- Chlorodifluoromethane (CFC-22)
- Trifluoromethane (HFC-23)
- Chlorofluoromethane (HCFC-31)
- Difluoromethane (HFC-32)
- Decafluoropentane (HFC-43-10mee)
- Ethylfluoride (HFC-161)
- Trichlorotrifluoroethane (CFC-113)
- Dichlorotetrafluoroethane (CFC-114)
- Chloropentafluoroethane (CFC-115)
- 2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)
- 1,1,2-Trifluoroethane (HCFC-123a)
- 2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)
- Pentafluoroethane (HFC-125)
- 1,1,2,2,-Tetrafluoroethane (HFC-134)
- 1,1,1,2-Tetrafluoroethane (HFC-134a)
- 1,1-Dichloro-1-fluoroethane (HCFC-141b)
- 1-Chloro-1,1,-difluoroethane (HCFC-142b)
- 1,1,1-Trifluoroethane (HFC-143a)
- Fluoroethane (HCFC-151a)
- 1,1-Difluoroethane (HFC-152a)
- Pentafluoropropane (HFC-225ca)
- Pentafluoropropane (HFC-225cb)
- Hexafluoropropane (HFC-236ea)
- Hexafluoropropane (HFC-236fa)
- Pentafluoropropane (HFC-245ca)
- Pentafluoropropane (HFC-245ea)
- Pentafluoropropane (HFC-245eb)
- Pentafluoropropane (HFC-245fa)
- Pentafluorobutane (HFC-365mfc)

- Parachlorobenzotrifluoride (PCBTF)
- Methoxybutane (HFE-7100)
- Nonafluorobutane (HFE-7200)
- Heptafluoropropane ((CF<sub>3</sub>)<sub>2</sub>CF<sub>2</sub>OCH<sub>3</sub>)
- Heptafluoropropane ((CF<sub>3</sub>)CF<sub>2</sub>OC<sub>2</sub>H<sub>5</sub>)
- Heptafluoro-3-methoxy propane (HFE-7000)
- 3-Ethoxy-dodecafluoro-2-trifluoromethyl hexane (HFE-7500)
- Heptafluoropropane (HFC-227ea)
- Methyl formate
- Decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300)
- Propylene carbonate
- Dimethyl carbonate
- Perchloroethylene
- Cyclic, branched, or linear completely methylated siloxanes
- Methyl acetate
- Volatile methyl siloxanes
- Acetone

Plus the following four classes of perfluorocarbons (PFCs)

- Cyclic, branched, or linear completely fluorinated alkanes
- Cyclic, branched, or linear completely fluorinated ethers with no unsaturations
- Cyclic, branched, or linear completely fluorinated tertiary amines with no unsaturations
- Sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

### 2.2.1 Point Sources

Emissions and source-specific data for point sources were developed for the 2017 inventory by Illinois EPA. The primary source of data for point sources was source-reported emissions. These data are reported by the sources annually as part of the inventory process conducted by Illinois EPA and include emissions, process rates, operating schedules, emission control data, and other relevant information obtained from the permit files and plant inspections. The data was converted to an Access<sup>®</sup> database for processing and retrieval. Emissions were computed on a typical daily ozone season basis for each point source process using the original data.

### **2.2.2 Area Sources**

Area source emissions were typically estimated by multiplying an emission factor by a known indicator of activity for each source category and each county. Area source emissions for 2017 were based on data available for population, employment, and the like. For the 2017 inventory, USEPA made available activity data at the county level for each state for many categories. Unfortunately, these data were not always representative of 2017. In other cases, data was provided from national estimates. If data more specific to Illinois was available, it was used by Illinois EPA. Emission estimates for 2017 emissions were developed using 2017 category activity levels, where available, or projections of changes in activity from 2014 to 2017 levels with a preference to Illinois-specific data. Emission controls were accounted for by using either adjusted emission factors or through the use of control factors. Appendix F includes the factors used to develop the emission estimates. Category summary tables reflecting Chicago and Metro-East NAA county emissions are also included.

### **2.2.3 Mobile Sources**

On-road motor vehicle emissions were estimated by use of USEPA's MOVES model. Inputs to run the model were provided by the Division of Mobile Source Programs within the Bureau of Air. The MOVES model is a significant departure from the previous on-road mobile source model so resulting emissions should not be compared to previous inventories. The MOVES model allows data to be pre-aggregated to different levels. Pre-aggregating data at a higher level than hourly reduces the time necessary for a calculation. An hourly run may take hours for a single county. For the ozone inventory, it was not necessary to do any pre-aggregation since the model ran sufficiently quickly in calculating daily emissions. Additional details on the types of data used in MOVES can be found in Section 5.0.

Emissions were also estimated for off-road equipment. The vast majority of off-road mobile sources were calculated using USEPA's MOVES model. The MOVES model does not calculate emissions for railroad locomotives, aircraft, or commercial marine vessels. Illinois played a significant role in calculating locomotive emissions for the nation based on data made available by USEPA. The emissions calculated for Illinois were then used for the 2017 inventory. Commercial marine vessel emissions were grown from 2014 values. Aircraft emissions were calculated using the number of landings and take-offs in conjunction with an emission factor using EDMS. Further discussion of off-road equipment emission estimation methodologies and actual estimates are contained in Section 5.2.

## **2.3 Results**

The 2017 Emission Inventory summary of the total ozone precursor emission estimates for the State of Illinois is shown in Tables 2-1 and 2-2.

The magnitude of the total NO<sub>x</sub> and VOM emissions for the state by geographic region are delineated in the bar charts of Figures 2-1 through 2-4. The percentage contributions of the individual regions to the statewide total are shown in Figures 2-5 and 2-6. The pie charts of Figures 2-7 through 2-14 present the total ozone precursor emissions by source category for each geographic region of the state.

Figures 2-15 through 2-18 show the emissions of the source categories for the previous four inventories and the current inventory. It is important to note that while a general trend can be identified, two inventory years may have had different methodologies to calculate emissions. This is particularly the case with on-road and off-road emissions in 2014. The MOVES model used to calculate on-road and off-road emissions was an updated version of the model since the 2011 inventory. Using updated emission factors between inventories most commonly occurs with the area source category along with the addition of new area source categories. Point sources are the most comparable from year-to-year since the emission factors do not typically change often.

Category summaries by pollutant for the 2017 statewide inventory are given in Appendices A through D. Appendix E presents a county-by-county summary of point, area, on-road, and off-road emissions. Appendix H includes the surrogates used to apportion area source emissions to the nonattainment townships (portions of counties).

Table 2-1: Total Ozone Inventory Typical Summer Day Emissions (tons/day)

	<b>Point</b>	<b>Area</b>	<b>On-Road</b>	<b>Off-Road</b>	<b>Total</b>
Chicago NAA					
NOx	75.19	32.29	170.08	135.59	413.14
VOM	44.32	217.80	77.73	76.59	416.45
Metro-East NAA					
NOx	11.57	1.71	18.94	15.16	47.39
VOM	9.72	17.03	7.69	5.57	40.01
Attainment Area					
NOx	227.52	41.98	151.56	312.42	733.48
VOM	82.81	300.61	66.77	95.82	546.01
Statewide					
NOx	314.28	75.98	340.57	463.18	1,194.01
VOM	136.85	535.45	152.19	177.99	1,002.47

Table 2-2: Total Ozone Inventory Annual Emissions (tons/year)

	<b>Point</b>	<b>Area</b>	<b>On-Road</b>	<b>Off-Road</b>	<b>Total</b>
Chicago NAA					
NOx	11,631.09	26,484.32	59,321.86	39,931.44	137,368.71
VOM	11,805.24	76,913.53	28,170.39	20,459.08	137,348.25
Metro-East NAA					
NOx	3,119.65	1,323.31	6,520.09	3,827.33	14,790.38
VOM	3,057.04	6,293.30	2,511.94	1,461.03	13,323.31
Attainment Area					
NOx	50,751.34	23,842.55	51,749.85	71,219.33	197,563.07
VOM	23,900.02	132,596.69	22,403.64	31,227.00	210,127.34
Statewide					
NOx	65,502.07	51,650.51	117,591.80	114,978.09	349,722.15
VOM	38,762.31	215,803.51	53,085.96	53,147.11	360,798.89

Figure 2-1: Daily NOx Emission Summary (tons/day)

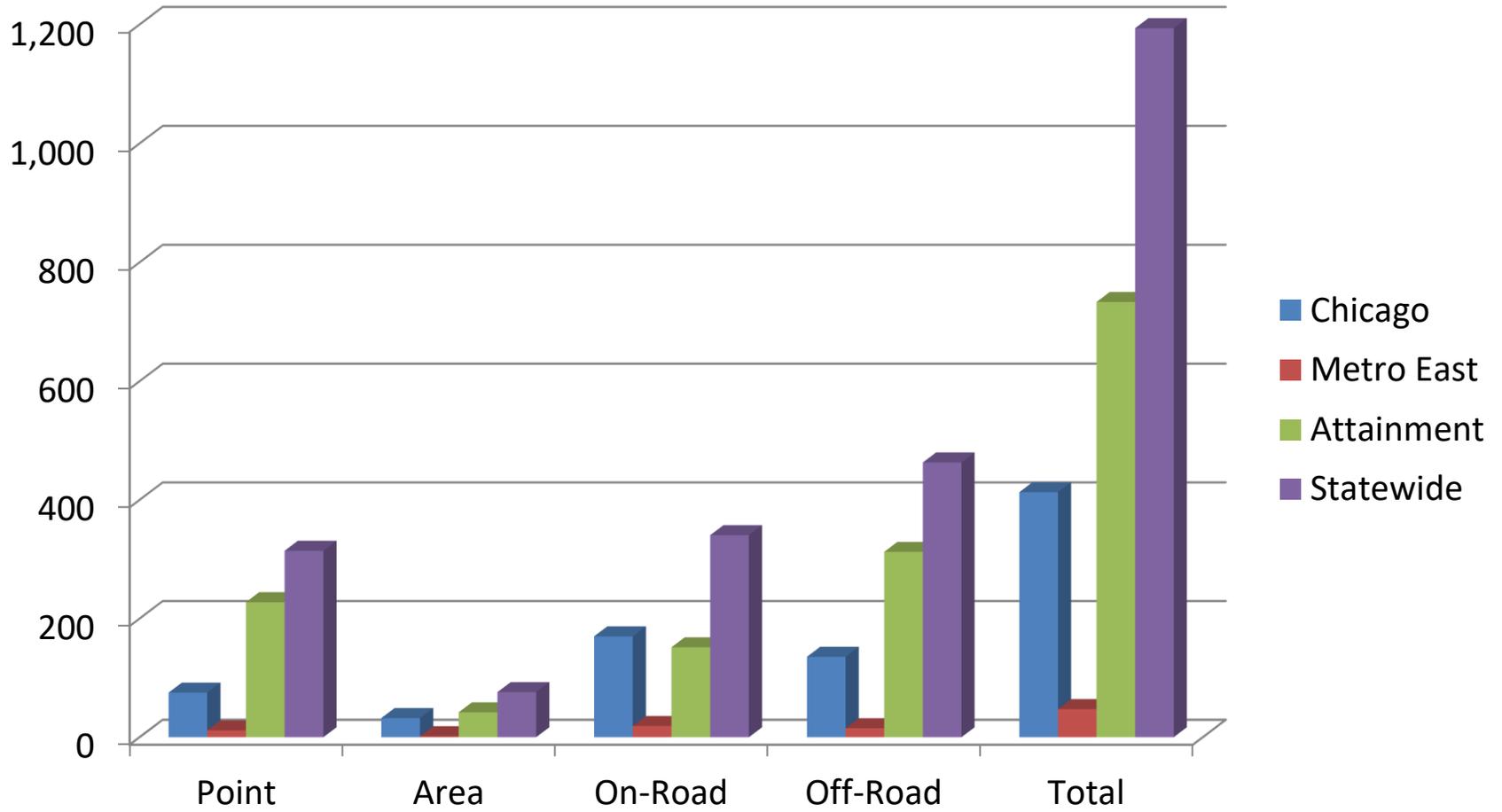


Figure 2-2: Annual NOx Emission Summary (tons/year)

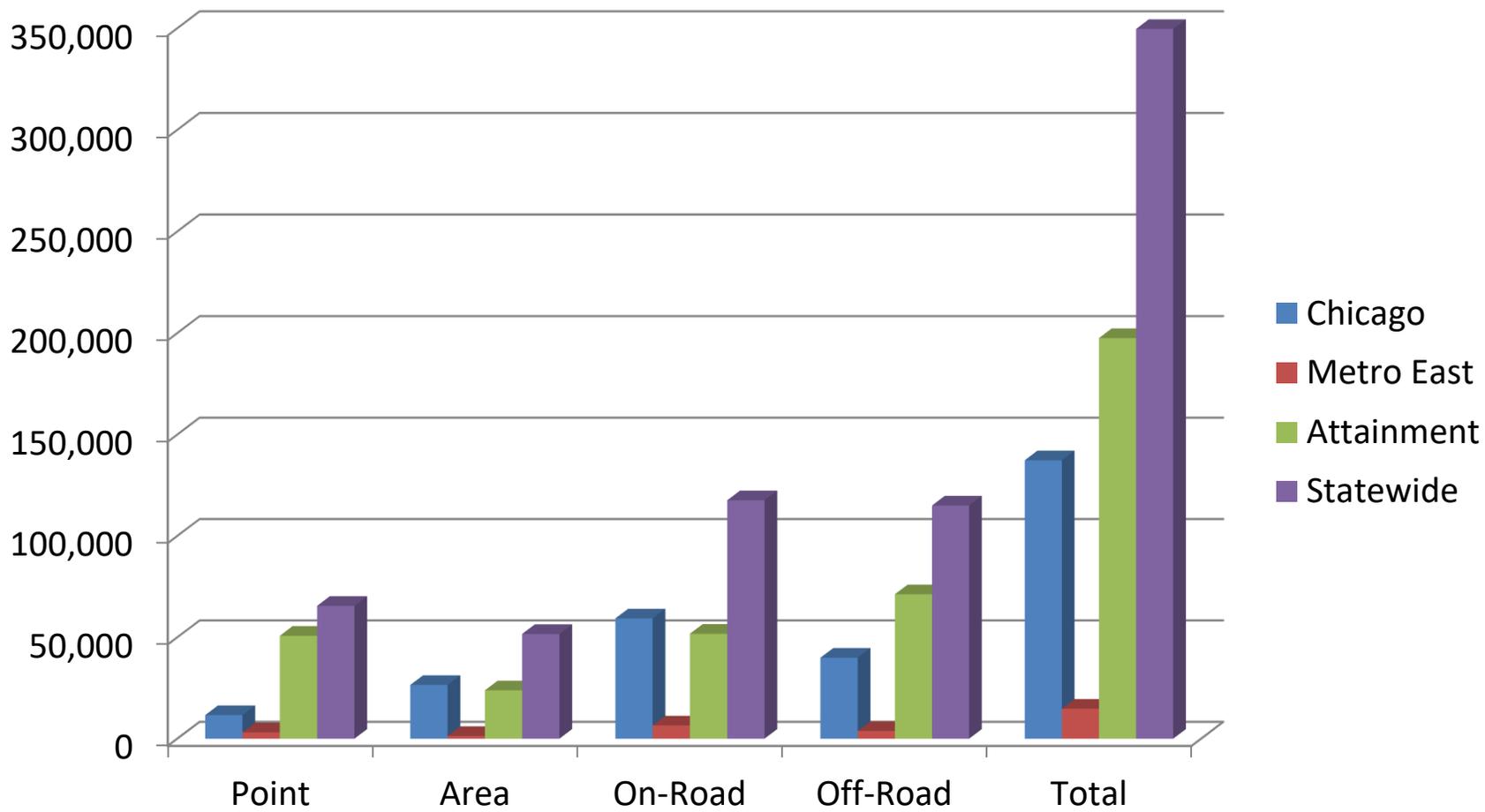


Figure 2-3: Daily VOM Emission Summary (tons/day)

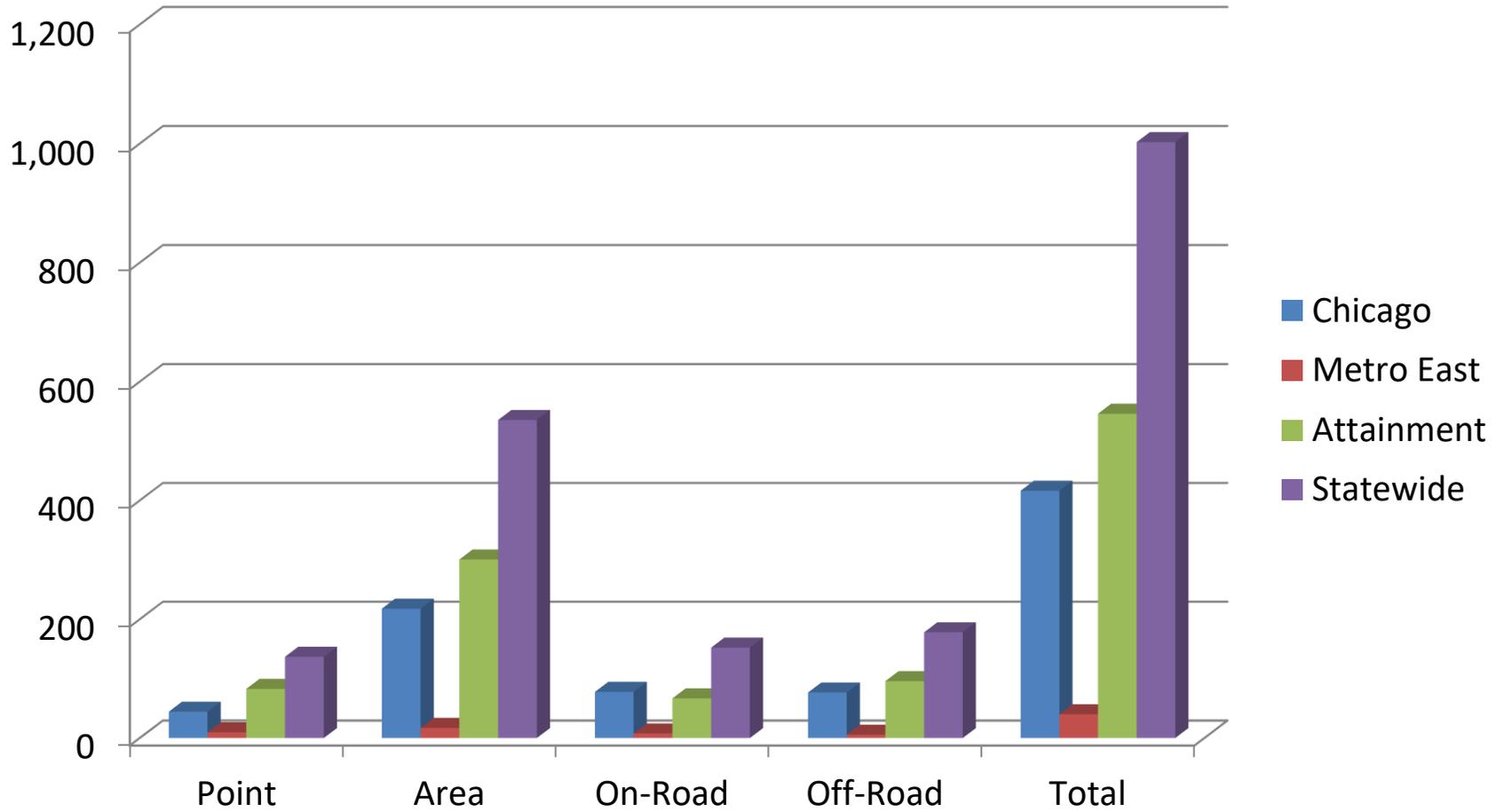


Figure 2-4: Annual VOM Emission Summary (tons/year)

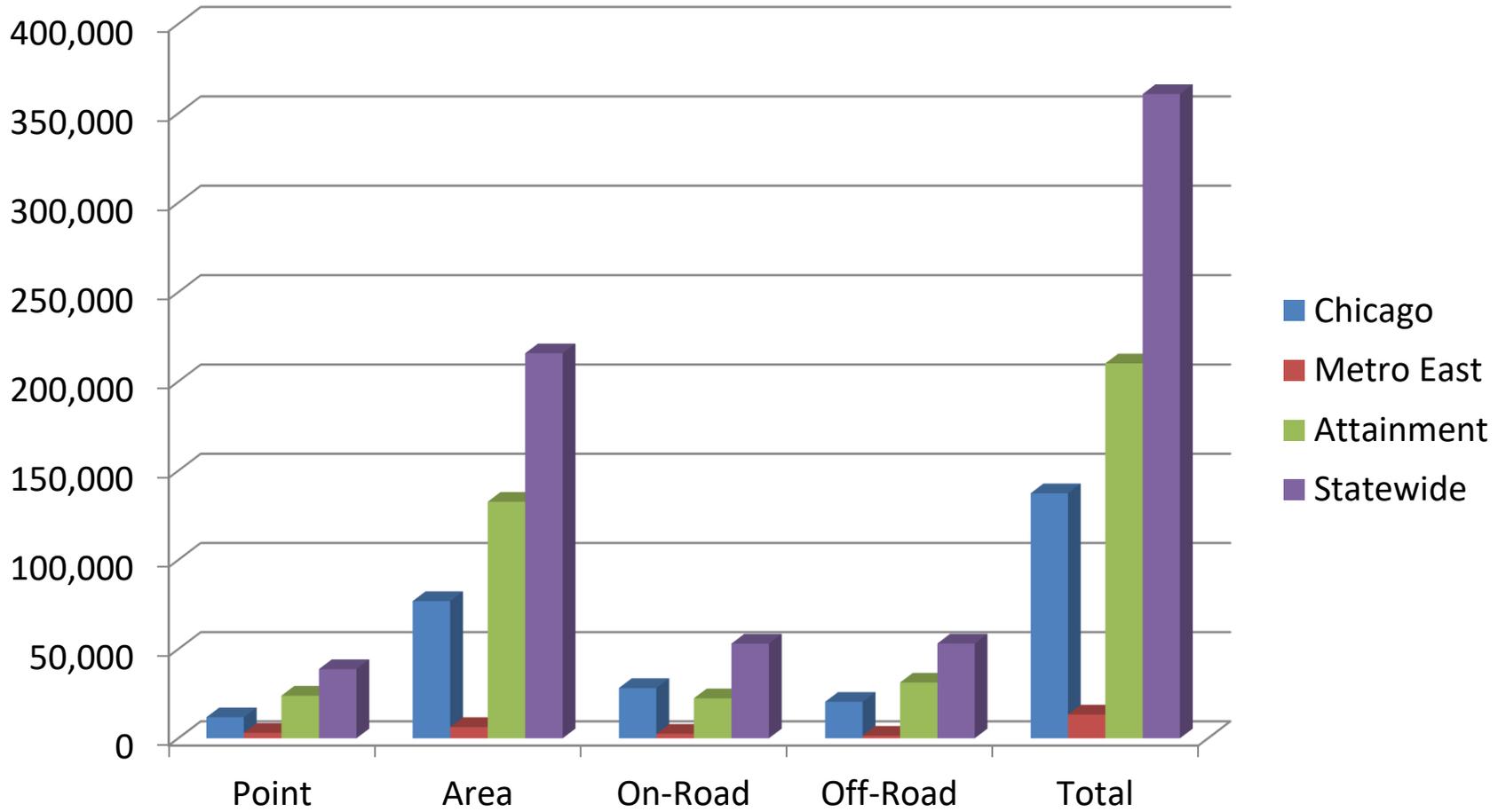


Figure 2-5: Statewide Geographic Contributions of Ozone Precursor Daily Emissions (tons/day)

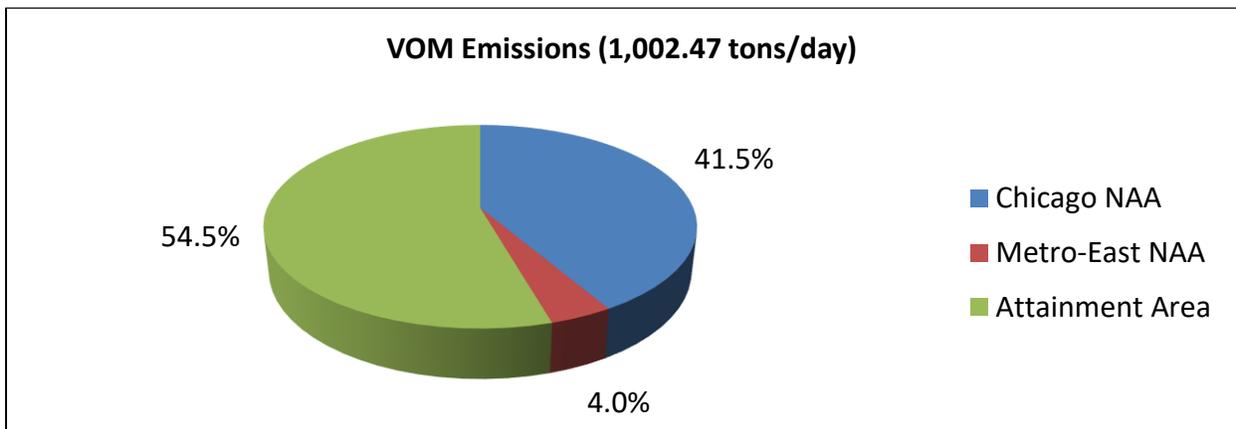
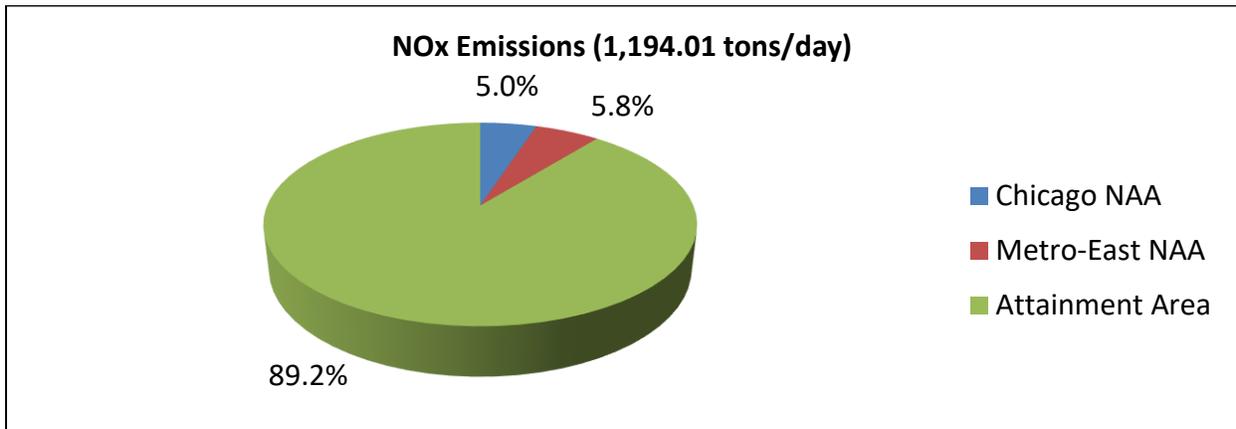


Figure 2-6: Statewide Geographic Contributions of Ozone Precursor Annual Emissions (tons/year)

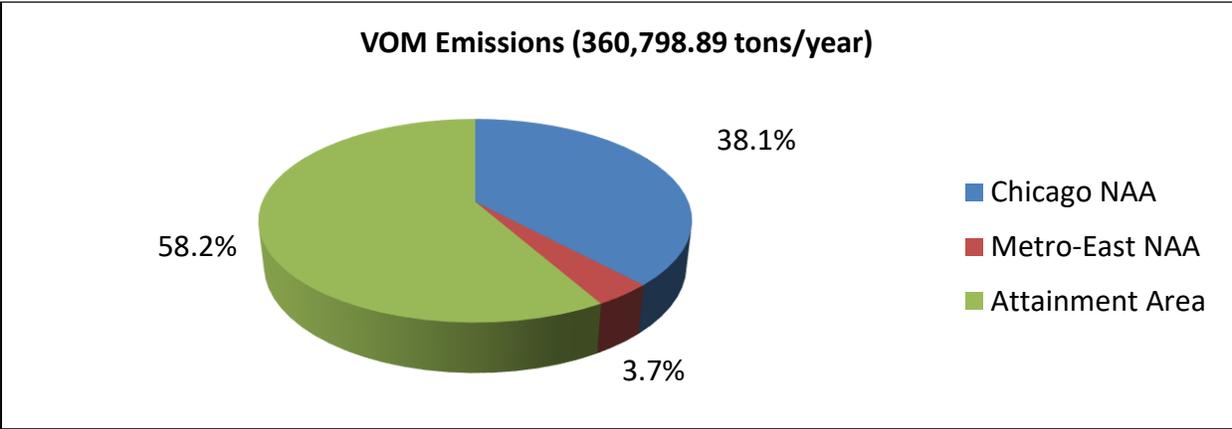
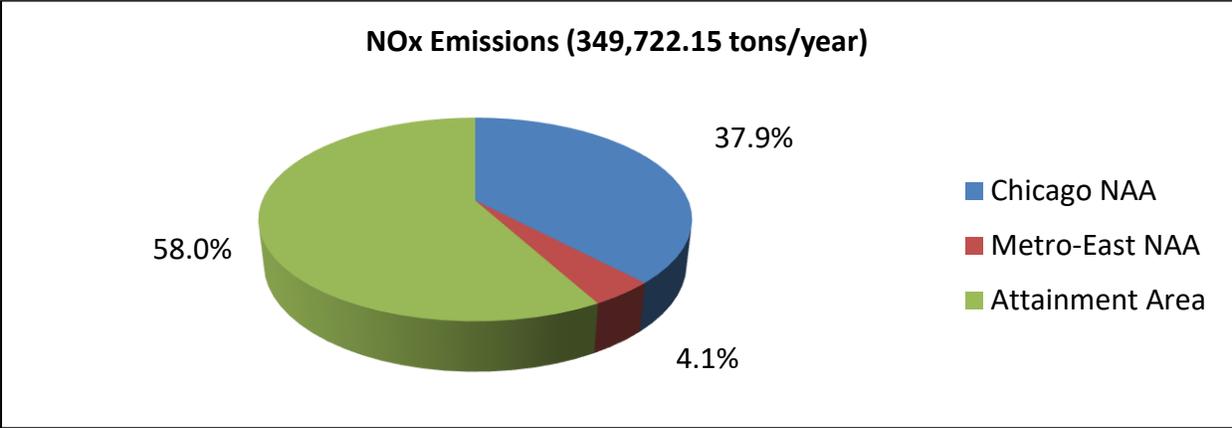


Figure 2-7: Chicago NAA Ozone Precursor Daily Emissions (tons/day)

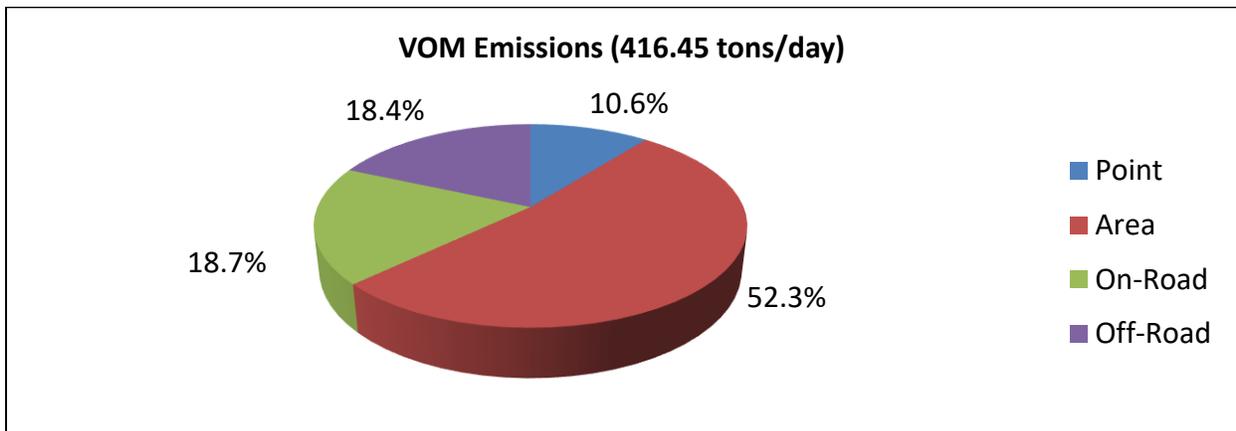
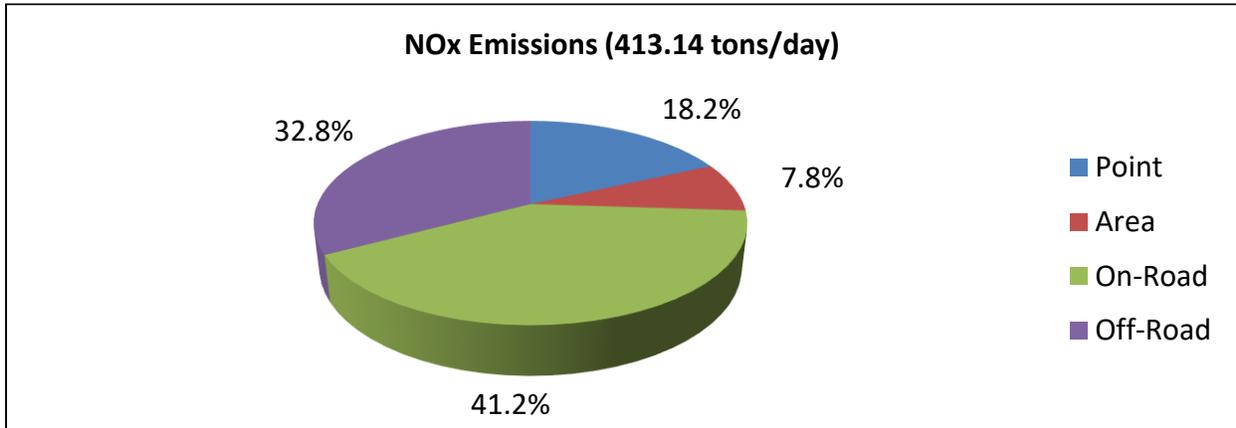


Figure 2-8: Chicago NAA Ozone Precursor Annual Emissions (tons/year)

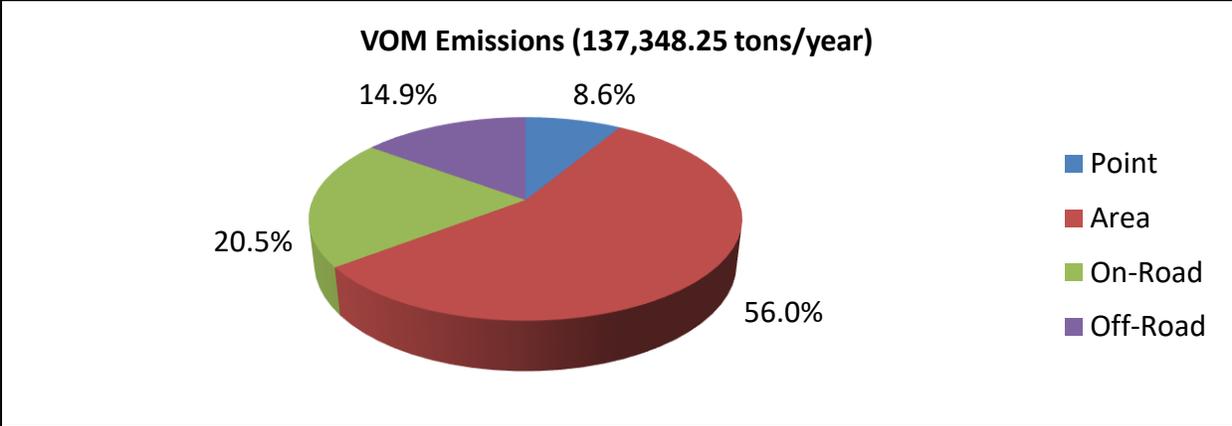
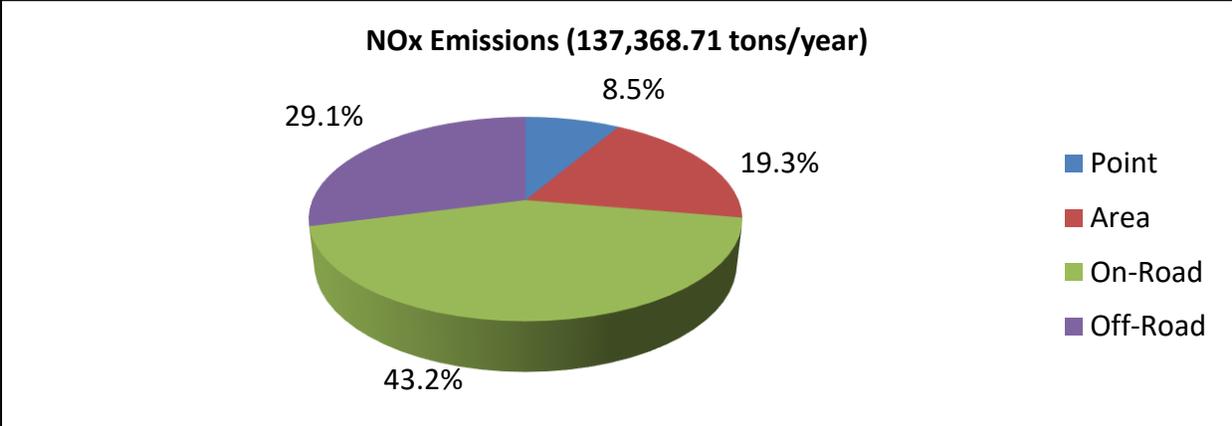


Figure 2-9: Metro-East NAA Ozone Precursor Daily Emissions (tons/day)

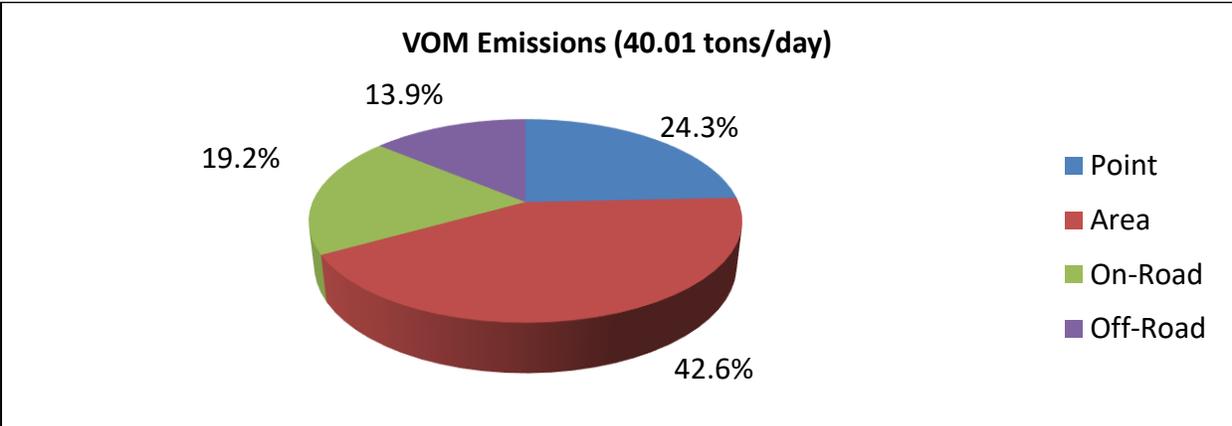
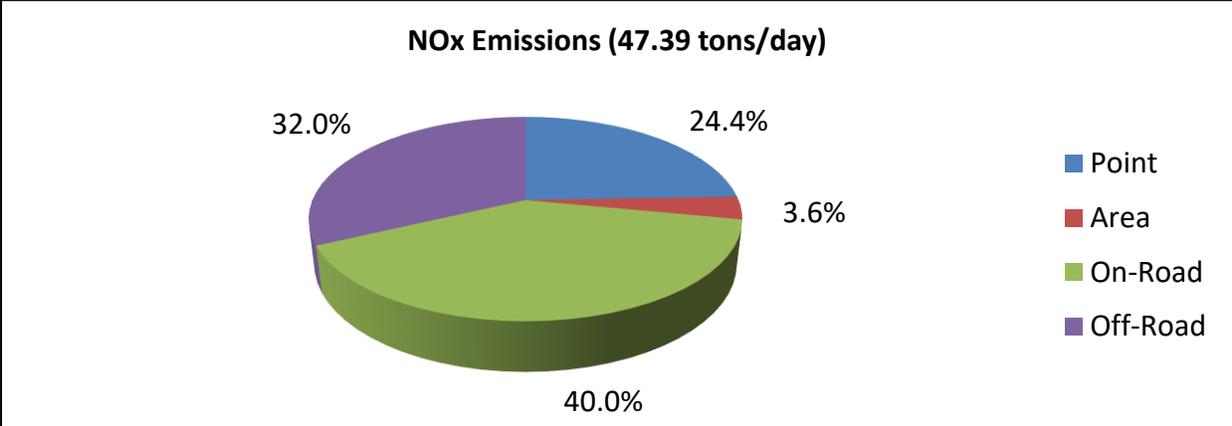


Figure 2-10: Metro-East NAA Ozone Precursor Annual Emissions (tons/year)

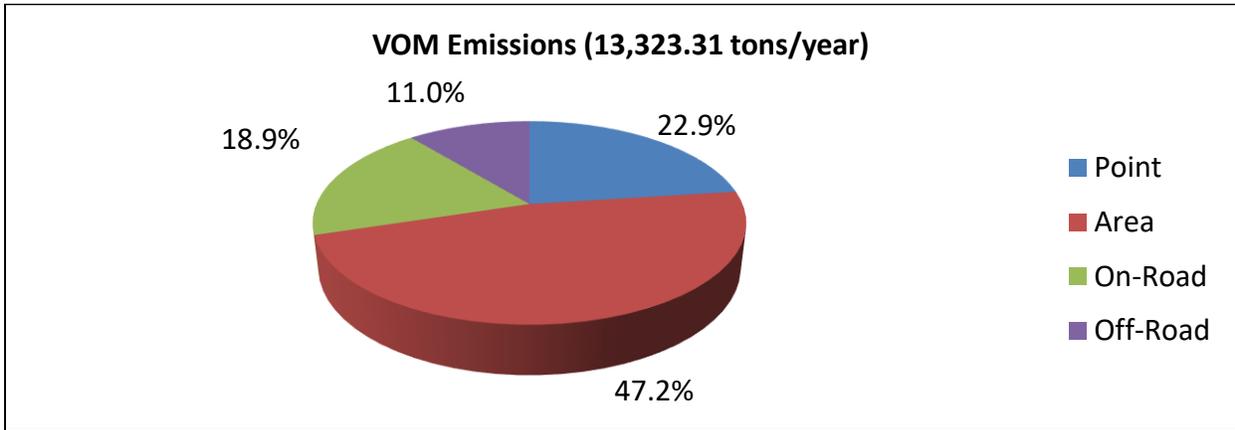
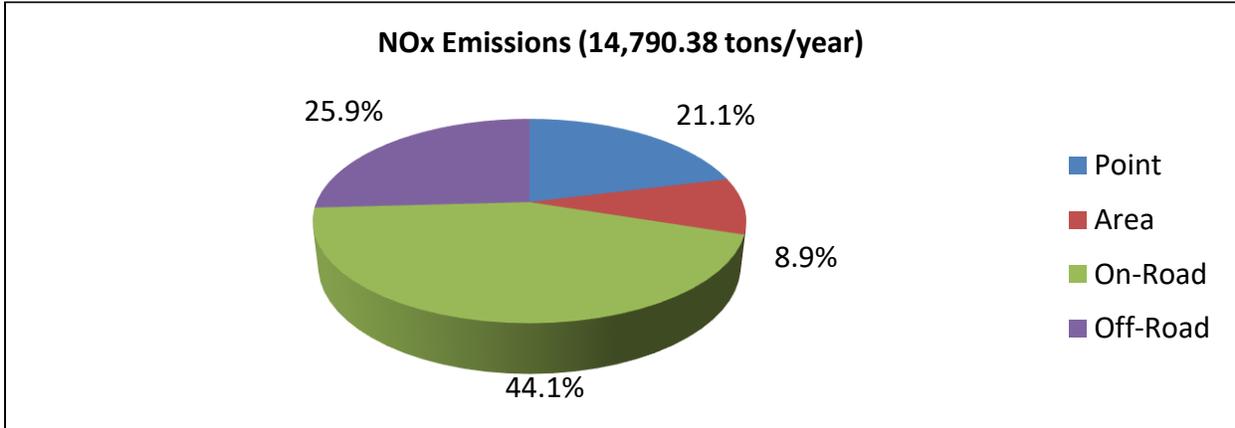


Figure 2-11: Attainment Area Ozone Precursor Daily Emissions (tons/day)

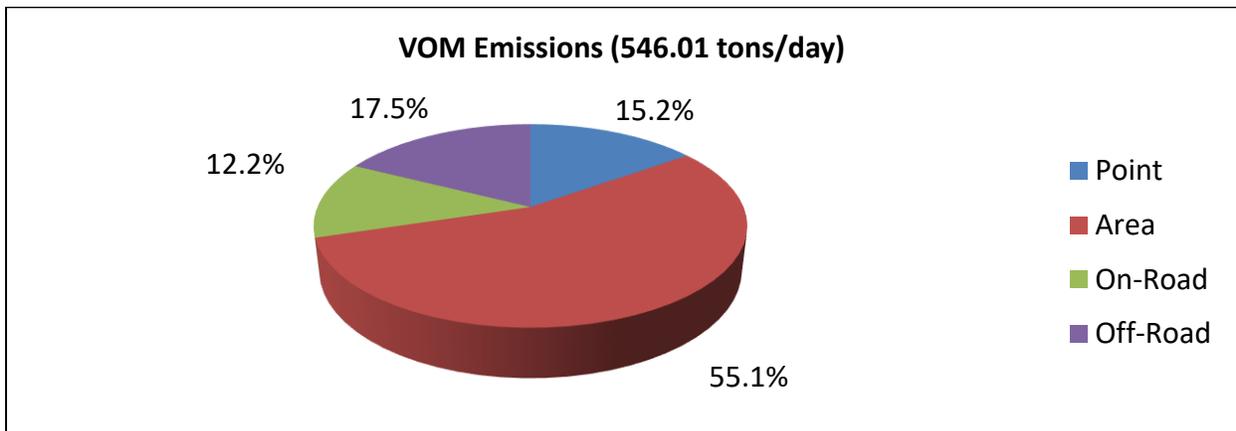
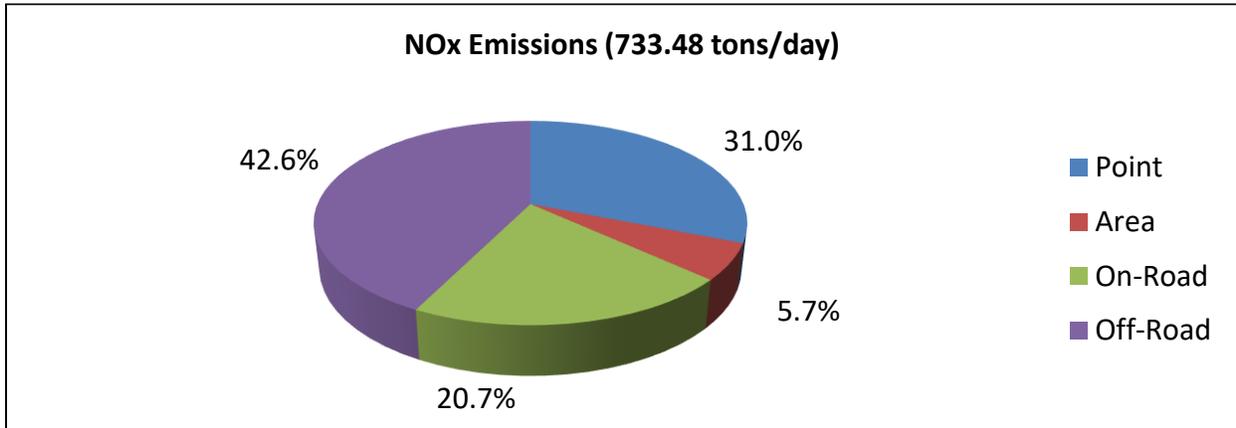


Figure 2-12: Attainment Area Ozone Precursor Annual Emissions (tons/year)

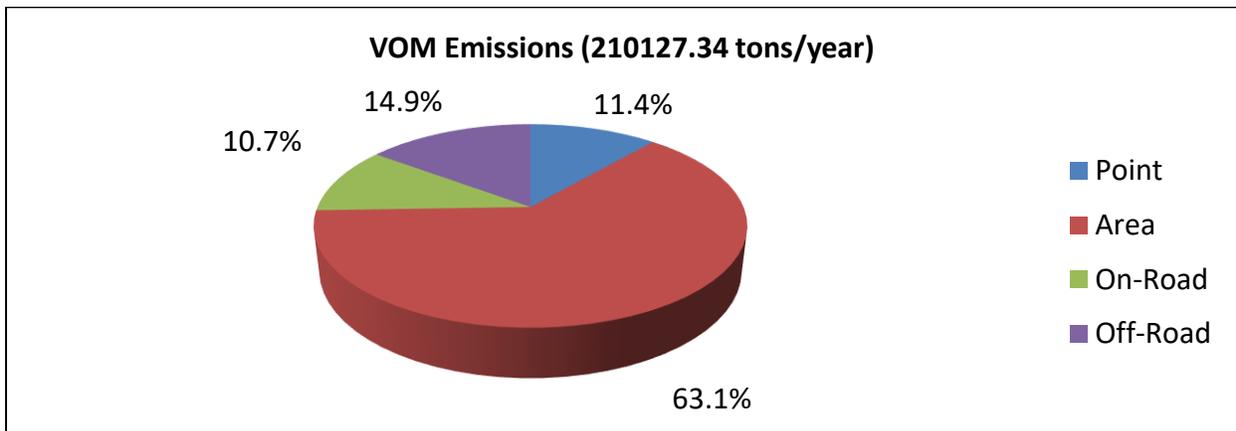
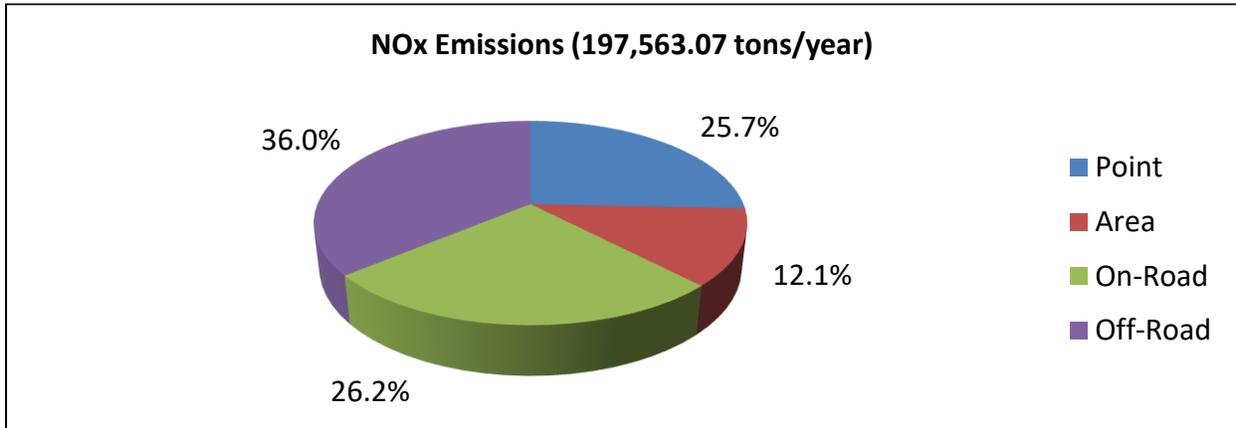


Figure 2-13: Statewide Ozone Precursor Daily Emissions (tons/day)

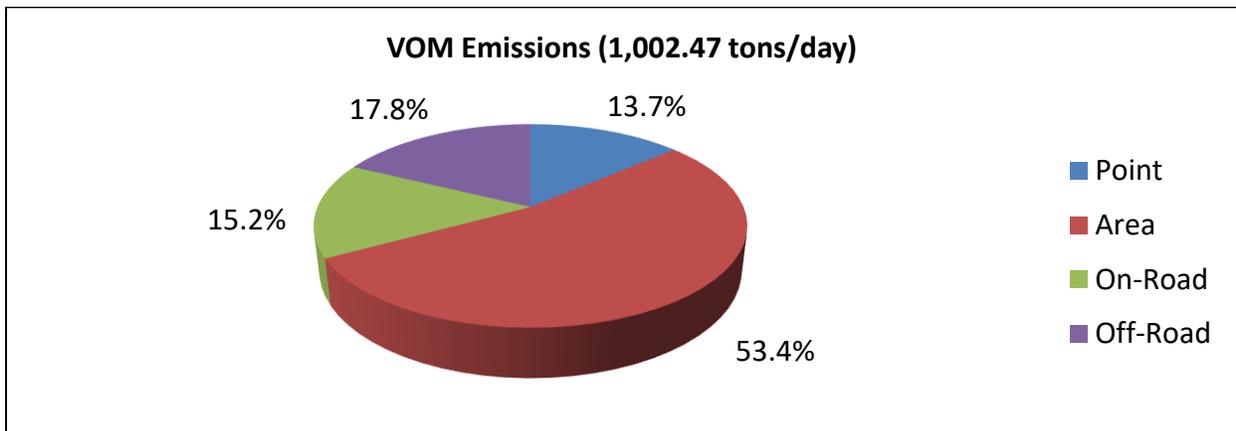
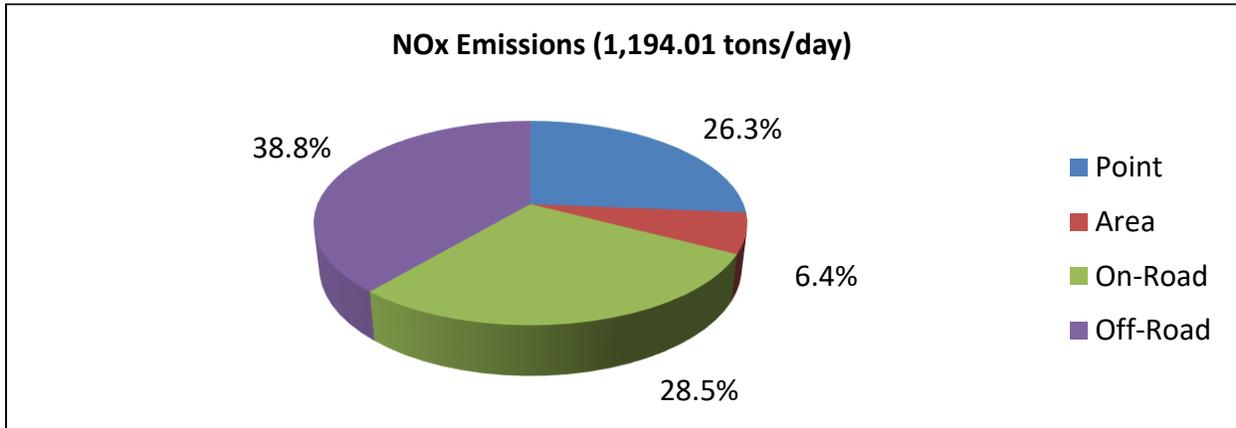


Figure 2-14: Statewide Ozone Precursor Annual Emissions (tons/year)

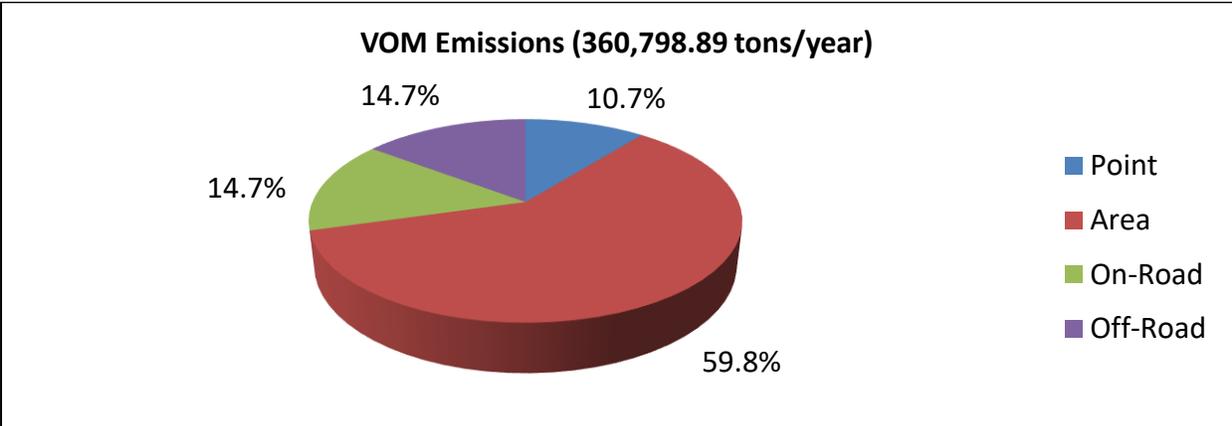
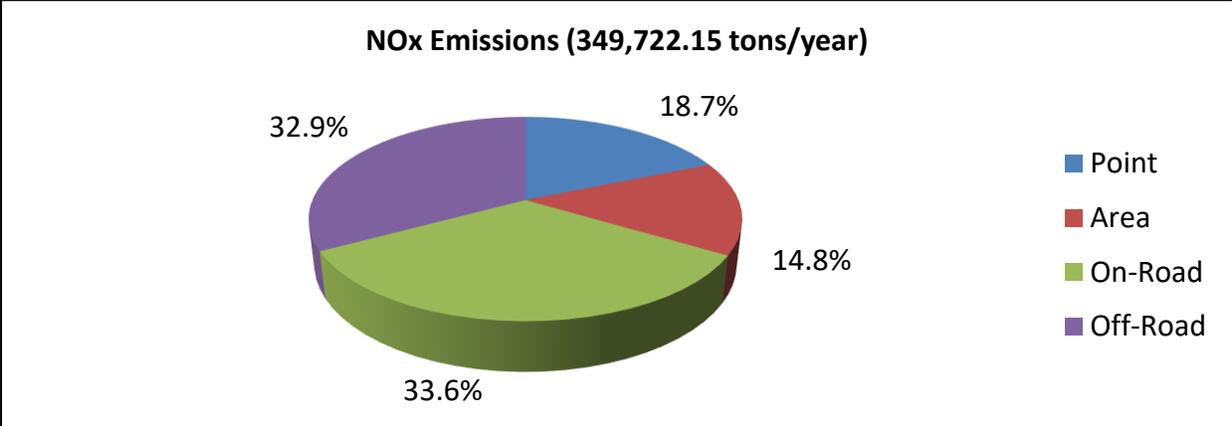


Figure 2-15: Historical Daily NOx Emissions (tons/day)

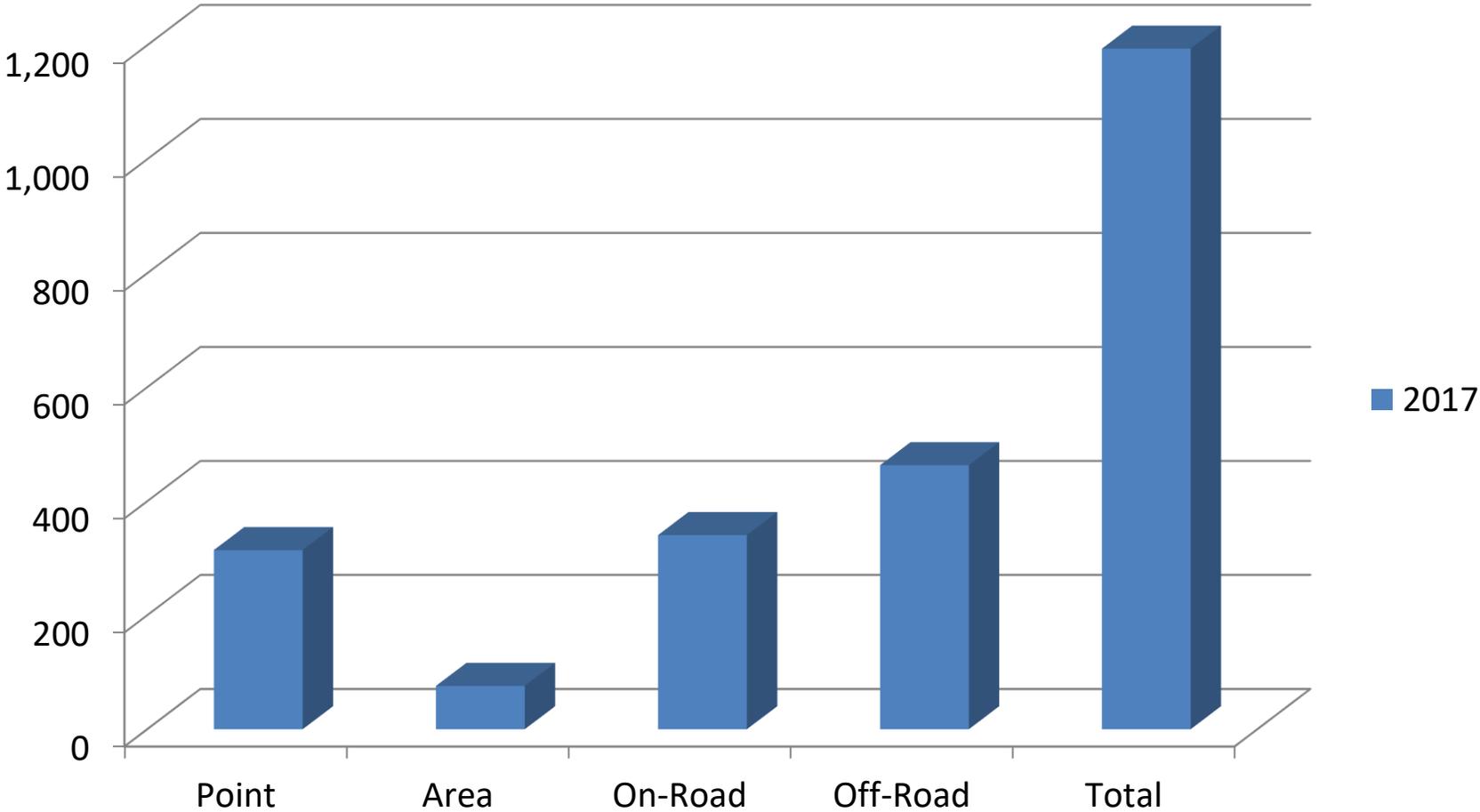


Figure 2-16: Historical Annual NOx Emissions (tons/year)

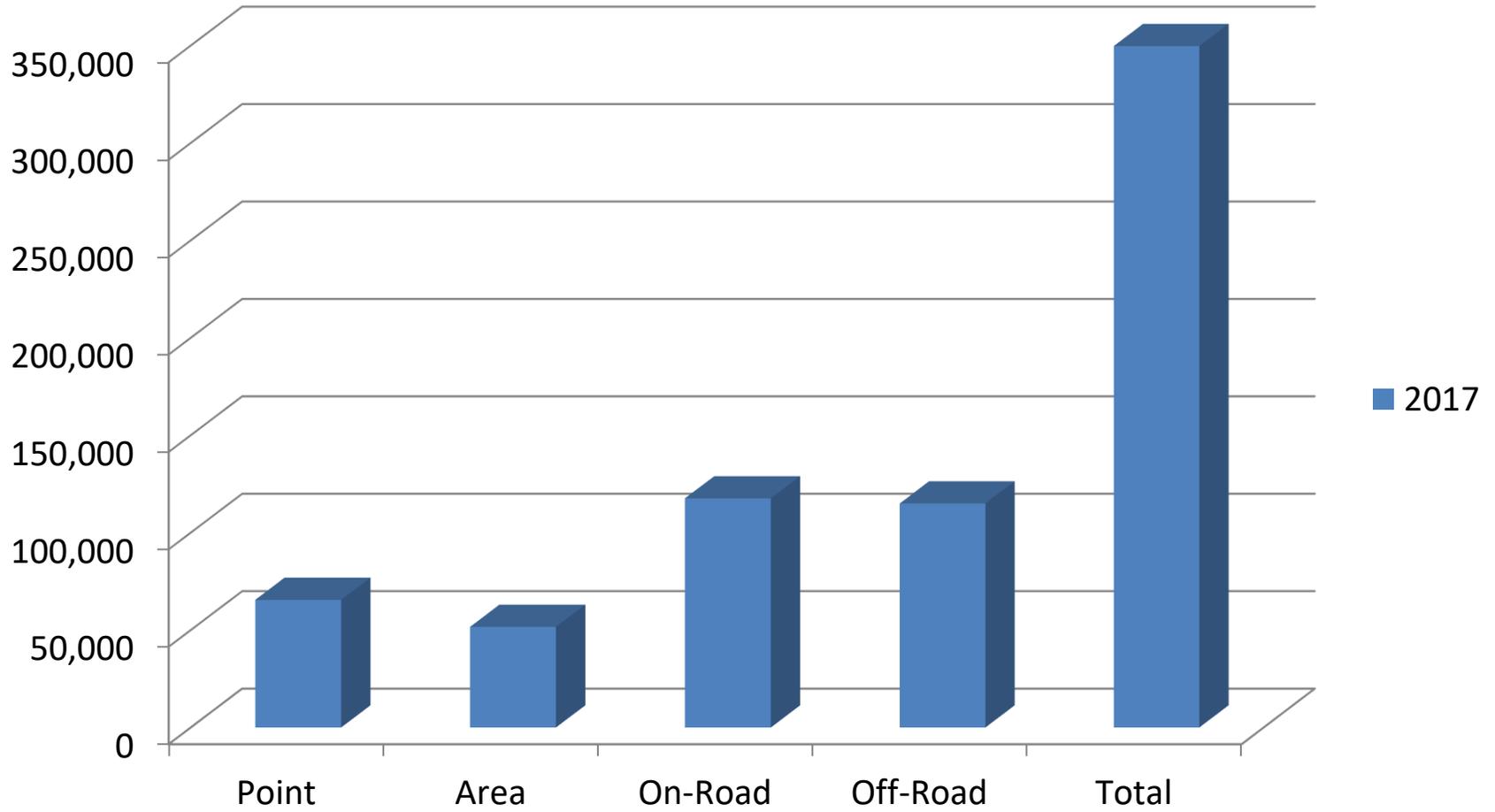


Figure 2-17: Historical Daily VOM Emissions (tons/day)

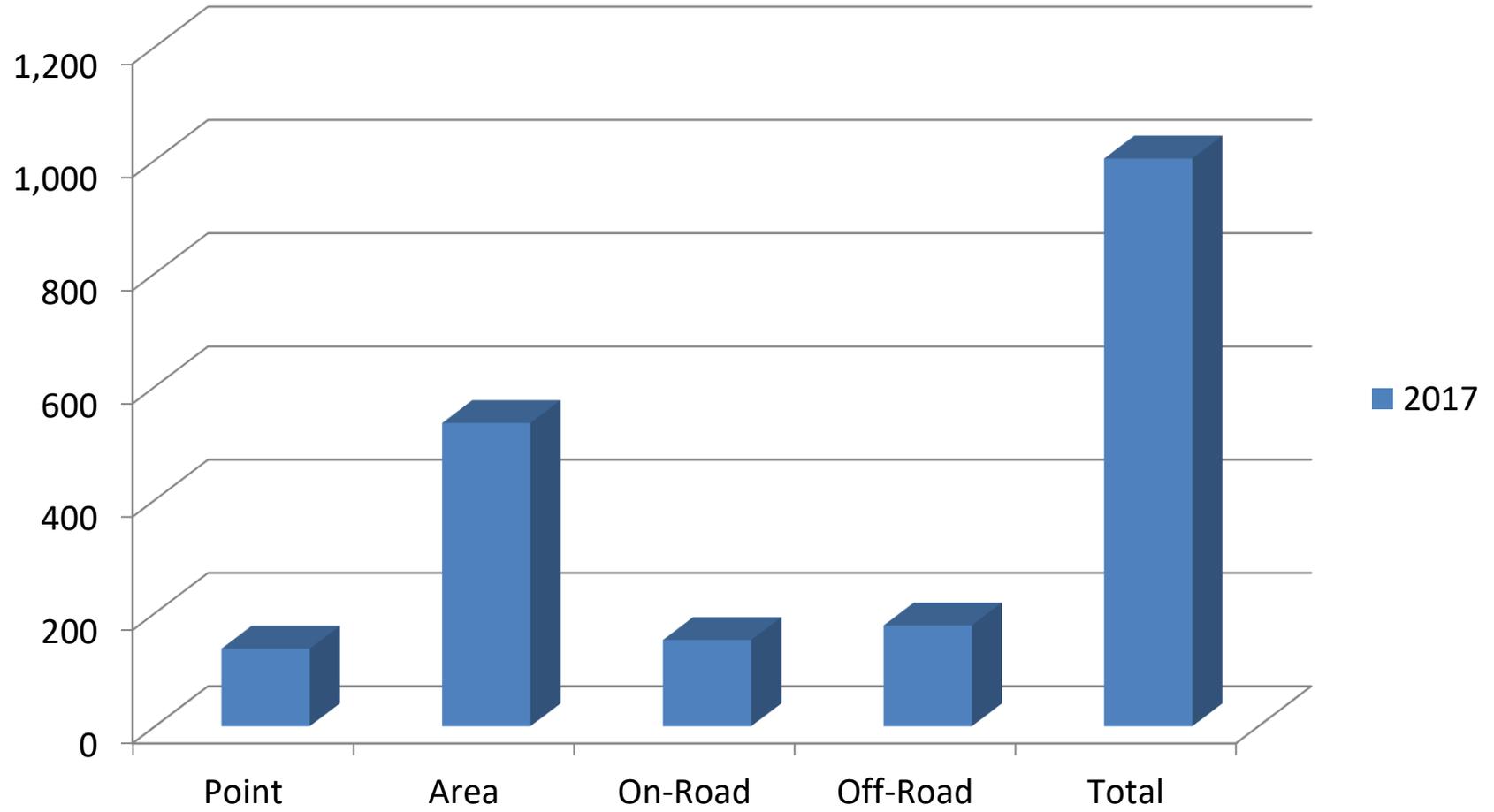
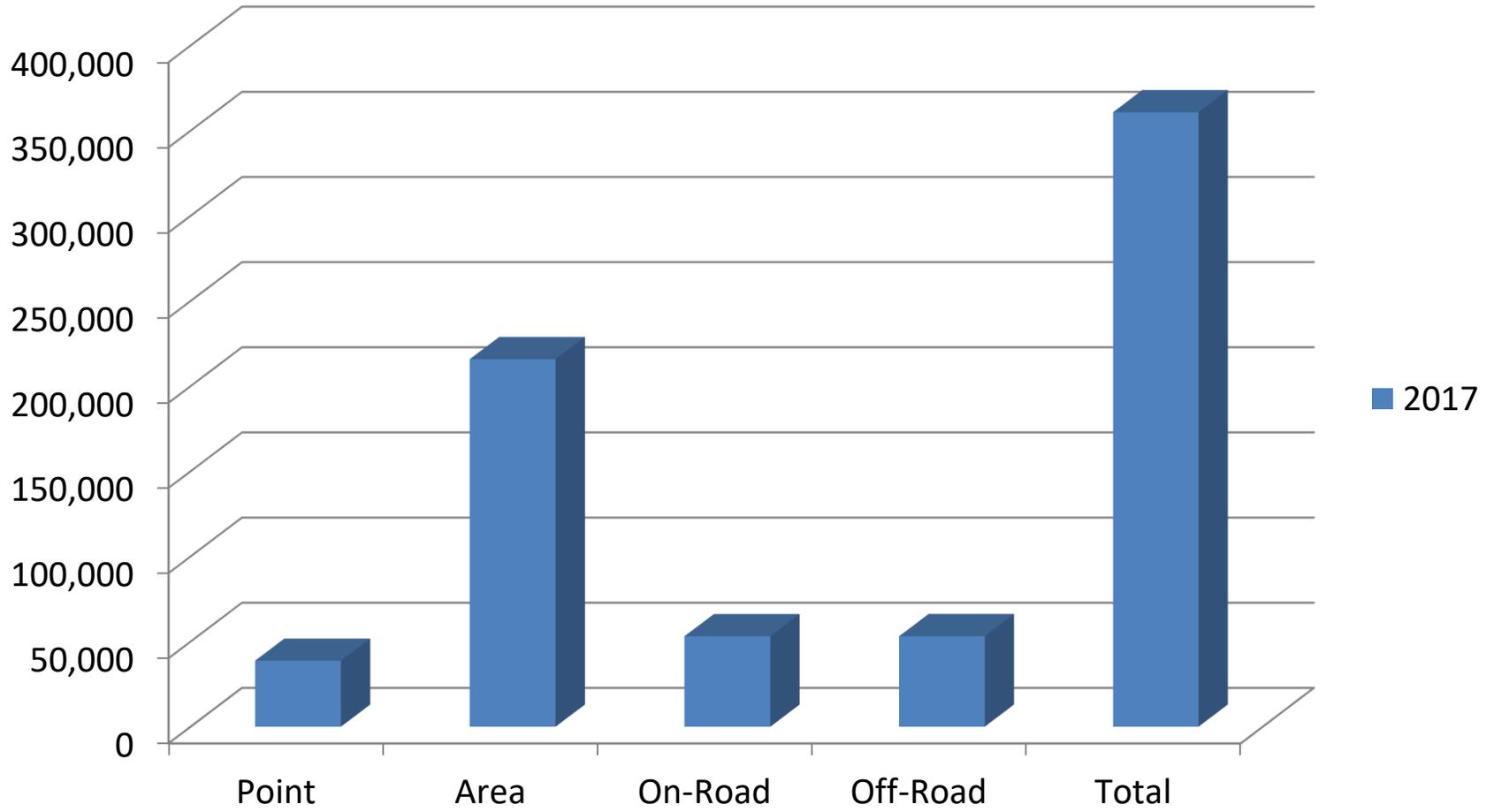


Figure 2-18: Historical Annual VOM Emissions (tons/year)





### **3 Point Sources**

A major distinction typically made in emission inventories is the distinction between point and area sources. The Illinois EPA maintains detailed, unit-by-unit data for permitted sources. These data are obtained from permit applications and AERs. Since the Illinois EPA has very few *de minimus* emission exemptions from permitting, the 10 ton per year inventory requirement indicated by USEPA inventory guidance is more than adequately met for Illinois sources with permits. It is not uncommon for emissions from a permitted source to be much less than 10 tons/year. Sources that have registered under the ROSS program have their emissions included in the inventory if those emissions existed in the inventory at any given time. New ROSS sources are included in the area source inventory as appropriate.

The sources described above are known as point sources. The area source inventory includes all other stationary sources not included in the point source inventory. In cases where the two categories overlap (e.g., fuel combustion and solvent use), care has been taken to not double-count emissions. Area sources are covered in Section 4. The point source inventory described herein is considered to be the most current and accurate source of emission data available for 2017.

#### **3.1 Source Identification and Data Collection**

The sources to be included in the 2017 inventory were identified using the Illinois EPA's ICEMAN database. All operating sources that existed in ICEMAN as of the end of 2017 are included in this inventory.

The 2017 point source inventory was prepared by the Illinois EPA using source reported data from AERs. When a source failed to submit an AER for 2017, other data such as previous Illinois EPA estimates were used.

#### **3.2 Emission Estimation Methodologies**

Source-reported actual emissions are used in the 2017 ozone inventory. AERs provided the ozone season hourly emissions and operating schedules that enabled the calculation of ozone season weekday emissions. Where operating schedules were missing or not required to be reported, Illinois EPA estimates were used. These estimates came from previously submitted AERs or from permit applications. Typical emission estimation methodologies include material balance and emission factors.

Since the inventory included VOM emissions, care was taken to exclude photochemically non-reactive materials. Emission rates from these types of materials are stored separately from VOM in ICEMAN so it was a simple task to exclude their emissions. The list of the compounds that USEPA has identified as being photochemically non-reactive is included in Section 2.2.

### 3.3 Point Source Emissions

Table 3-1 includes the emissions from all sources classified as point sources.

Table 3-1: Point Source Emissions

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	28.01	4,347.27	25.00	6,481.85
DuPage	5.81	664.94	3.73	992.41
Grundy Twps	3.91	1,217.64	1.45	459.72
Kane	3.95	400.69	3.00	848.88
Kendall Twps	0.38	82.68	0.26	80.49
Lake	11.25	1,819.33	1.88	393.46
Will	21.88	3,098.53	9.00	2,548.45
<b>Chicago NAA</b>	<b>75.19</b>	<b>11,631.09</b>	<b>44.32</b>	<b>11,805.24</b>
Madison	10.15	2,767.62	7.63	2,470.39
St. Clair	1.42	352.02	2.09	586.64
<b>Metro-East NAA</b>	<b>11.57</b>	<b>3,119.65</b>	<b>9.72</b>	<b>3,057.04</b>
<b>Attainment Area</b>	<b>227.52</b>	<b>50,751.34</b>	<b>82.81</b>	<b>23,900.02</b>
<b>State Total</b>	<b>314.28</b>	<b>65,502.07</b>	<b>136.85</b>	<b>38,762.31</b>

## 4 Area Sources

Area sources are those activities for which aggregated source and emission information is maintained for entire source categories rather than for each individual source. The Illinois EPA is responsible for preparing the area source emission inventory. The area source inventory includes NO<sub>x</sub> and reactive VOM for the entire state. Emission estimates are presented for the ozone NAAs of Chicago and Metro-East St. Louis, as well as the remaining part of the state, which is in attainment of the 8-hour ozone standard. Where no township-specific information was available for the Chicago NAA counties of Grundy and Kendall, apportioning factors were developed and applied to estimate area source activity.

### 4.1 Source Identification

Area source categories of NO<sub>x</sub> and VOM emissions have been identified primarily through previous inventories. These inventories have followed previous guidance and have been found to be complete. As more is learned of emissions and emission sources, USEPA introduces new source categories for area sources. Illinois EPA reviewed this list and incorporated the new category of residential grilling for the 2017 inventory.

Care is also taken when identifying potential area source categories. As stated previously, Illinois EPA's point source inventory for 2017 has a very low threshold of emission rates. This means that categories classified as area sources in other states are included solely in the point source inventory for Illinois. The best example of this is coal combustion in industrial and commercial boilers. It is believed that all boilers of this type are permitted and therefore exist in the point source inventory. In cases such as this, Illinois EPA reports zero emissions for the area source category to USEPA. Reporting zero emissions removes all doubt whether the category was overlooked or not. Categories the Illinois EPA assumes are covered completely in the point source inventory include:

- Cremation (animal and human)
- Fuel combustion
  - Commercial/Institutional
    - Coal
    - Wood
  - Industrial
    - Coal
    - Wood
- Fuel marketing
  - Bulk plants
  - Bulk terminals

- Surface coating
  - Aircraft
  - Appliances
  - Marine
  - Metal cans
  - Metal coils
  - Metal furniture
  - Motor vehicles
  - Railroad
  - Wood furniture

## **4.2 Emission Estimation Methods**

### **4.2.1 Calculation Methodologies**

Several methodologies have been used in estimating area source emissions.

- Emission factors
  - Standard (e.g., lb/person, lb/acre)
  - Formula (methods that may require multiple data values)
- Growth factors
- Data from inventories compiled by others
  - Data from USEPA
  - Studies funded by LADCO

In most cases, emissions were calculated by an emission factor. A listing of these emission factors can be found in Appendix F.

In some cases, emissions were calculated by using a growth factor to convert 2014 emissions to 2017 emissions. It should also be noted that for some of the fuel combustion categories, consumption data for some fuels was only available for calendar year 2016. However, the natural gas consumption rate was available for 2017. If the most recent year of data for a fuel was 2016, it was grown to a 2017 value by using the ratio of natural gas consumption for 2017 to that of 2016. Growth factors used in the inventory are identified in Appendix F.

In some cases, an entire data set provided by the USEPA was used in compiling the 2017 area source inventory. For the 2017 these categories included forest fires, prescribed burning, and gas/oil exploration and production. The gas/oil category used the same emissions as the 2014 inventory.

#### **4.2.2 Sources of Data**

Various sources have been used to determine activity/commodity level data and emission information for area source inventory purposes. Among these are the USEPA's AP-42, USEPA's WebFIRE emission factor database, and data from federal and state agencies including USEPA's Office of Air Quality Planning and Standards, the U.S. Department of Energy, U.S. Bureau of Labor Statistics, Illinois Department of Transportation, Illinois Department of Agriculture, and so on.

#### **4.2.3 Rule Effectiveness and Rule Penetration**

For area sources subject to a VOM control equipment regulation, a rule effectiveness (RE) factor has been applied to the control efficiency when determining the emission rates. The RE adjustment reflects the assumption that regulations typically are not 100 percent effective at all sources at all times. For example, if a RE factor of 95 percent has been assumed, a value of 0.95 is multiplied against the control efficiency before subtracting the efficiency from unity.

In cases where a control regulation is applied to an area source category, a rule penetration (RP) adjustment may be required. The RP factor takes into account the fact that, due to exemptions within the rule, all sources within the category may not be regulated. Illinois EPA has used best judgment in the development and application of such factors.

Due to the use of emission factors, rather than the independent calculation of uncontrolled emissions and subsequent control efficiencies, the use of RE and RP factors is limited. In addition, a number of rules regulating area source emissions deal with operational behavior (e.g., keeping the lid closed on a cold-cleaner) rather than the addition of control equipment.

#### **4.2.4 Double Counting of Emissions**

A major concern in the development of an area source inventory is the possibility of double-counting emissions. Because some area source methodologies estimate emissions from all sources within a category, emissions already contained in the point source inventory may also be included in the area source estimate. In these instances, the point source emissions must be subtracted from the gross area source estimate to determine the net area source estimate. Commonly affected area source categories are:

- Dry Cleaning
- Fuel Combustion
- Graphic Arts
- Incineration
- Solvent Cleaning

#### **4.2.5 Annual Emissions to Daily Emissions Calculation**

Emissions have been expressed in tons/day and tons/year. Activity levels and/or emission factors are frequently based on longer timeframes than a daily timeframe, so adjustment factors have been applied to estimate the typical summer weekday emissions. In order to determine the ozone season activity fraction, a seasonal adjustment factor is applied to the annual emission estimate. This factor compares the summer season percentage of annual activity for the specific category to a uniform seasonal activity level (25 percent). Therefore, if 30 percent of a certain activity occurs during the summer season, the seasonal adjustment factor would be  $30 \div 25$  or 1.2.

In order to estimate emissions on a typical weekday, an activity adjustment factor is applied to the annual emission estimate. This factor is developed in one of two ways. First, the factor can be developed by dividing by the number of days per week an activity occurs and that total divided by 52, the number of weeks in the year. Therefore, the activity adjustment factor for an activity which occurs uniformly, seven days a week is calculated using the following equation:  $1 \div 7 \div 52 = 0.00275$ .

The second method is used when a percentage of work-week (Monday-Friday) activity has been developed. In this case, a work-week percentage of 33 percent activity converts into an activity adjustment factor by dividing 0.33 by 5 for the number of days the activity occurs divided by 52 which equals 0.00127.

A listing of these seasonal and daily adjustment factors can be found in Appendix G.

#### **4.2.6 Estimating Emissions at the Township Level**

In addition to the counties of Cook, DuPage, Kane, Lake, McHenry, and Will, the Chicago NAA also includes Aux Sable and Goose Lake Townships in Grundy County and also Oswego Township in Kendall County. Township-specific area source activity data is not always available. County emissions are apportioned to the township level using other surrogates related to the activity being estimated. These surrogates and their resulting percentages are included in Appendix H.

### 4.3 Categorical Emission Summary

The following tables identify the emissions of each area source category that was calculated for the 2017 inventory.

Table 4-1: Agricultural Field Burning Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.14	0.00	0.60
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.08	0.00	0.30
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.22</b>	<b>0.00</b>	<b>0.90</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>7.46</b>	<b>0.00</b>	<b>27.57</b>
<b>State Total</b>	<b>0.00</b>	<b>7.67</b>	<b>0.00</b>	<b>28.47</b>

Table 4-2: Agricultural Pesticide Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.04	8.62
DuPage	0.04	8.62
Grundy Twps	0.11	26.71
Kane	0.57	136.52
Kendall Twps	0.07	17.20
Lake	0.06	14.11
Will	0.80	191.16
<b>Chicago NAA</b>	<b>1.68</b>	<b>402.95</b>
Madison	1.00	239.09
St. Clair	0.87	208.35
<b>Metro-East NAA</b>	<b>1.87</b>	<b>447.43</b>
<b>Attainment Area</b>	<b>90.84</b>	<b>21,769.03</b>
<b>State Total</b>	<b>94.39</b>	<b>22,619.41</b>

Table 4-3: Aircraft Refueling Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.32	96.94
DuPage	0.24	71.59
Grundy Twps	0.00	0.00
Kane	0.07	21.55
Kendall Twps	0.00	0.00
Lake	0.10	30.35
Will	0.18	54.45
<b>Chicago NAA</b>	<b>0.92</b>	<b>274.90</b>
Madison	0.10	31.10
St. Clair	0.13	38.03
<b>Metro-East NAA</b>	<b>0.23</b>	<b>69.13</b>
<b>Attainment Area</b>	<b>3.05</b>	<b>69.13</b>
<b>State Total</b>	<b>4.19</b>	<b>1,258.14</b>

Table 4-4: Architectural Coating Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	21.80	6,097.18
DuPage	3.89	1,088.25
Grundy Twps	0.06	17.40
Kane	2.24	625.56
Kendall Twps	0.23	65.42
Lake	2.94	823.12
Will	2.90	810.41
<b>Chicago NAA</b>	<b>34.06</b>	<b>9,527.34</b>
Madison	1.11	310.55
St. Clair	1.10	307.10
<b>Metro-East NAA</b>	<b>2.21</b>	<b>617.65</b>
<b>Attainment Area</b>	<b>17.28</b>	<b>4,833.37</b>
<b>State Total</b>	<b>53.55</b>	<b>14,978.37</b>

Table 4-5: Asphalt Paving Emissions – Cutback Asphalt

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	7.61
DuPage	0.00	2.21
Grundy Twps	0.00	0.07
Kane	0.00	1.74
Kendall Twps	0.00	0.07
Lake	0.00	2.07
Will	0.00	2.54
<b>Chicago NAA</b>	<b>0.00</b>	<b>16.30</b>
Madison	0.00	1.72
St. Clair	0.00	1.56
<b>Metro-East NAA</b>	<b>0.00</b>	<b>3.27</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>70.40</b>
<b>State Total</b>	<b>0.00</b>	<b>89.98</b>

Table 4-6: Asphalt Paving Emissions – Emulsified Asphalt

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.08	11.97
DuPage	0.02	3.48
Grundy Twps	0.00	0.11
Kane	0.02	2.73
Kendall Twps	0.00	0.10
Lake	0.02	3.25
Will	0.03	4.00
<b>Chicago NAA</b>	<b>0.16</b>	<b>25.64</b>
Madison	0.02	2.70
St. Clair	0.02	2.45
<b>Metro-East NAA</b>	<b>0.03</b>	<b>5.15</b>
<b>Attainment Area</b>	<b>0.71</b>	<b>110.73</b>
<b>State Total</b>	<b>0.91</b>	<b>141.51</b>

Table 4-7: Automobile Refinishing Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.79	204.22
DuPage	0.20	51.57
Grundy Twps	0.00	0.52
Kane	0.07	17.05
Kendall Twps	0.00	1.10
Lake	0.12	30.72
Will	0.11	29.50
<b>Chicago NAA</b>	<b>1.29</b>	<b>334.66</b>
Madison	0.05	13.56
St. Clair	0.05	12.02
<b>Metro-East NAA</b>	<b>0.10</b>	<b>25.59</b>
<b>Attainment Area</b>	<b>1.44</b>	<b>373.41</b>
<b>State Total</b>	<b>2.82</b>	<b>733.65</b>

Table 4-8: Commercial Cooking Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.52	188.45
DuPage	0.09	33.64
Grundy Twps	0.00	0.54
Kane	0.05	19.33
Kendall Twps	0.01	2.02
Lake	0.07	25.44
Will	0.07	25.05
<b>Chicago NAA</b>	<b>0.81</b>	<b>294.47</b>
Madison	0.03	9.60
St. Clair	0.03	9.49
<b>Metro-East NAA</b>	<b>0.05</b>	<b>19.09</b>
<b>Attainment Area</b>	<b>0.41</b>	<b>149.39</b>
<b>State Total</b>	<b>1.27</b>	<b>462.95</b>

Table 4-9: Consumer Solvent Use Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	60.41	21,965.47
DuPage	10.78	3,920.49
Grundy Twps	0.17	62.69
Kane	6.20	2,253.62
Kendall Twps	0.65	235.69
Lake	8.15	2,965.34
Will	8.03	2,919.57
<b>Chicago NAA</b>	<b>94.39</b>	<b>34,322.86</b>
Madison	3.08	1,118.78
St. Clair	3.04	1,106.35
<b>Metro-East NAA</b>	<b>6.12</b>	<b>2,225.13</b>
<b>Attainment Area</b>	<b>47.88</b>	<b>17,412.54</b>
<b>State Total</b>	<b>148.39</b>	<b>53,960.53</b>

Table 4-10: Cremation Emissions - Animal

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-11: Cremation Emissions - Human

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-12: Dry Cleaning Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.17
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
Will	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.17</b>
Madison	0.00	0.82
St. Clair	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.82</b>
<b>Attainment Area</b>	<b>0.02</b>	<b>4.72</b>
<b>State Total</b>	<b>0.02</b>	<b>5.71</b>

Table 4-13: Forest Fire Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	1.13	0.00	20.70
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.66	0.00	12.42
Will	0.01	1.22	0.14	23.65
<b>Chicago NAA</b>	<b>0.01</b>	<b>3.01</b>	<b>0.14</b>	<b>56.77</b>
Madison	0.00	0.04	0.00	0.71
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.04</b>	<b>0.00</b>	<b>0.71</b>
<b>Attainment Area</b>	<b>0.02</b>	<b>136.49</b>	<b>0.27</b>	<b>2,348.92</b>
<b>State Total</b>	<b>0.02</b>	<b>139.53</b>	<b>0.41</b>	<b>2,406.41</b>

Table 4-14: Fuel Combustion Emissions – Commercial/Institutional – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-15: Fuel Combustion Emissions – Commercial/Institutional – Distillate Oil

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.01	237.46	0.00	4.04
DuPage	0.06	56.61	0.00	0.96
Grundy Twps	0.00	0.43	0.00	0.01
Kane	0.02	17.56	0.00	0.30
Kendall Twps	0.00	1.05	0.00	0.02
Lake	0.02	28.42	0.00	0.48
Will	0.02	19.20	0.00	0.33
<b>Chicago NAA</b>	<b>0.12</b>	<b>360.72</b>	<b>0.00</b>	<b>6.14</b>
Madison	0.00	7.37	0.00	0.13
St. Clair	0.01	7.99	0.00	0.14
<b>Metro-East NAA</b>	<b>0.01</b>	<b>15.36</b>	<b>0.00</b>	<b>0.26</b>
<b>Attainment Area</b>	<b>0.07</b>	<b>113.94</b>	<b>0.00</b>	<b>1.94</b>
<b>State Total</b>	<b>0.20</b>	<b>490.02</b>	<b>0.00</b>	<b>8.35</b>

Table 4-16: Fuel Combustion Emissions – Commercial/Institutional – Kerosene

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	1.13	0.00	0.02
DuPage	0.00	0.26	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.08	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.13	0.00	0.00
Will	0.00	0.09	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>1.70</b>	<b>0.00</b>	<b>0.03</b>
Madison	0.00	0.04	0.00	0.00
St. Clair	0.00	0.04	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.08</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.56</b>	<b>0.00</b>	<b>0.01</b>
<b>State Total</b>	<b>0.00</b>	<b>2.33</b>	<b>0.00</b>	<b>0.04</b>

Table 4-17: Commercial Fuel Combustion Emissions – Commercial/Institutional – LPG

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.06	0.00	0.00
DuPage	0.00	0.01	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.01	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.09</b>	<b>0.00</b>	<b>0.01</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.13</b>	<b>0.00</b>	<b>0.01</b>

Table 4-18: Fuel Combustion Emissions – Commercial/Institutional – Natural Gas

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	3.42	4,349.99	0.19	243.43
DuPage	1.22	1,142.39	0.06	60.88
Grundy Twps	0.01	9.26	0.00	0.51
Kane	0.28	340.27	0.02	18.89
Kendall Twps	0.02	14.81	0.00	0.81
Lake	0.60	569.28	0.03	30.36
Will	0.39	383.60	0.02	21.10
<b>Chicago NAA</b>	<b>5.94</b>	<b>6,809.60</b>	<b>0.32</b>	<b>375.98</b>
Madison	0.19	173.37	0.01	9.54
St. Clair	0.18	157.96	0.01	8.69
<b>Metro-East NAA</b>	<b>0.37</b>	<b>331.34</b>	<b>0.02</b>	<b>18.23</b>
<b>Attainment Area</b>	<b>1.82</b>	<b>2,071.21</b>	<b>0.10</b>	<b>119.08</b>
<b>State Total</b>	<b>8.13</b>	<b>9,212.15</b>	<b>0.45</b>	<b>513.29</b>

Table 4-19: Fuel Combustion Emissions – Commercial/Institutional – Residual Oil

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Table 4-20: Fuel Combustion Emissions – Commercial/Institutional – Wood

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-21: Fuel Combustion Emissions – Industrial – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-22: Fuel Combustion Emissions – Industrial – Distillate Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.32	157.14	0.00	1.53
DuPage	0.11	48.45	0.00	0.48
Grundy Twps	0.00	0.35	0.00	0.00
Kane	0.06	27.68	0.00	0.28
Kendall Twps	0.00	1.24	0.00	0.01
Lake	0.10	44.70	0.00	0.45
Will	0.03	14.03	0.00	0.11
<b>Chicago NAA</b>	<b>0.62</b>	<b>293.59</b>	<b>0.01</b>	<b>2.87</b>
Madison	0.00	4.39	0.00	0.00
St. Clair	0.01	4.82	0.00	0.05
<b>Metro-East NAA</b>	<b>0.01</b>	<b>9.21</b>	<b>0.00</b>	<b>0.05</b>
<b>Attainment Area</b>	<b>0.68</b>	<b>182.43</b>	<b>0.00</b>	<b>1.81</b>
<b>State Total</b>	<b>1.01</b>	<b>485.23</b>	<b>0.01</b>	<b>4.73</b>

Table 4-23: Fuel Combustion Emissions – Industrial – Kerosene

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.32	0.00	0.00
DuPage	0.00	0.10	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.05	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.09	0.00	0.00
Will	0.00	0.04	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.60</b>	<b>0.00</b>	<b>0.01</b>
Madison	0.00	0.02	0.00	0.00
St. Clair	0.00	0.01	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.03</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.37</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>1.00</b>	<b>0.00</b>	<b>0.01</b>

Table 4-24: Fuel Combustion Emissions – Industrial – LPG

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.98	0.00	0.05
DuPage	0.00	0.29	0.00	0.02
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.17	0.00	0.01
Kendall Twps	0.00	0.01	0.00	0.00
Lake	0.00	0.27	0.00	0.01
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>1.72</b>	<b>0.00</b>	<b>0.09</b>
Madison	0.00	0.05	0.00	0.00
St. Clair	0.00	0.03	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.08</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.98</b>	<b>0.00</b>	<b>0.05</b>
<b>State Total</b>	<b>0.01</b>	<b>2.78</b>	<b>0.00</b>	<b>0.15</b>

Table 4-25: Fuel Combustion Emissions – Industrial – Natural Gas

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	3.82	2,466.75	0.04	79.82
DuPage	2.08	1,054.61	0.12	57.47
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.98	535.49	0.05	27.96
Kendall Twps	0.05	26.53	0.00	1.50
Lake	1.83	950.06	0.10	52.24
Will	0.00	182.77	0.00	1.25
<b>Chicago NAA</b>	<b>8.76</b>	<b>5,216.21</b>	<b>0.31</b>	<b>220.25</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	15.76	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>15.76</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>3.99</b>	<b>2,331.83</b>	<b>0.21</b>	<b>123.22</b>
<b>State Total</b>	<b>12.75</b>	<b>7,563.80</b>	<b>0.53</b>	<b>343.47</b>

Table 4-26: Fuel Combustion Emissions – Industrial – Residual Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.05	21.57	0.00	0.13
DuPage	0.01	6.47	0.00	0.04
Grundy Twps	0.00	0.05	0.00	0.00
Kane	0.01	3.71	0.00	0.02
Kendall Twps	0.00	0.17	0.00	0.00
Lake	0.01	5.98	0.00	0.04
Will	0.01	2.68	0.00	0.02
<b>Chicago NAA</b>	<b>0.09</b>	<b>40.63</b>	<b>0.00</b>	<b>0.24</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.21	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.06</b>	<b>24.93</b>	<b>0.00</b>	<b>0.15</b>
<b>State Total</b>	<b>0.15</b>	<b>65.78</b>	<b>0.00</b>	<b>0.39</b>

Table 4-27: Fuel Combustion Emissions – Industrial – Wood

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-28: Fuel Combustion Emissions – Residential – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Table 4-29: Fuel Combustion Emissions – Residential – Distillate Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.01	8.65	0.00	0.34
DuPage	0.00	0.81	0.00	0.03
Grundy Twps	0.00	0.04	0.00	0.00
Kane	0.00	0.40	0.00	0.02
Kendall Twps	0.00	0.08	0.00	0.00
Lake	0.00	0.46	0.00	0.02
Will	0.00	0.37	0.00	0.01
<b>Chicago NAA</b>	<b>0.01</b>	<b>10.82</b>	<b>0.00</b>	<b>0.42</b>
Madison	0.00	1.02	0.00	0.04
St. Clair	0.00	0.63	0.00	0.02
<b>Metro-East NAA</b>	<b>0.00</b>	<b>1.65</b>	<b>0.00</b>	<b>0.06</b>
<b>Attainment Area</b>	<b>0.01</b>	<b>15.39</b>	<b>0.00</b>	<b>0.60</b>
<b>State Total</b>	<b>0.02</b>	<b>27.85</b>	<b>0.00</b>	<b>1.08</b>

Table 4-30: Fuel Combustion Emissions – Residential – Kerosene

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	1.96	0.00	0.08
DuPage	0.00	0.18	0.00	0.01
Grundy Twps	0.00	0.01	0.00	0.00
Kane	0.00	0.09	0.00	0.00
Kendall Twps	0.00	0.02	0.00	0.00
Lake	0.00	0.10	0.00	0.00
Will	0.00	0.08	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>2.45</b>	<b>0.00</b>	<b>0.10</b>
Madison	0.00	0.23	0.00	0.01
St. Clair	0.00	0.14	0.00	0.01
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.37</b>	<b>0.00</b>	<b>0.01</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>3.49</b>	<b>0.00</b>	<b>0.14</b>
<b>State Total</b>	<b>0.00</b>	<b>6.31</b>	<b>0.00</b>	<b>0.24</b>

Table 4-31: Fuel Combustion Emissions – Residential – LPG

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.06	103.23	0.00	4.01
DuPage	0.01	13.45	0.00	0.52
Grundy Twps	0.00	1.90	0.00	0.07
Kane	0.01	14.48	0.00	0.56
Kendall Twps	0.00	3.41	0.00	0.13
Lake	0.01	10.82	0.00	0.42
Will	0.01	22.24	0.00	0.86
<b>Chicago NAA</b>	<b>0.10</b>	<b>169.52</b>	<b>0.00</b>	<b>6.58</b>
Madison	0.03	43.37	0.00	1.68
St. Clair	0.02	31.69	0.00	1.23
<b>Metro-East NAA</b>	<b>0.05</b>	<b>75.06</b>	<b>0.00</b>	<b>2.91</b>
<b>Attainment Area</b>	<b>0.65</b>	<b>1,066.20</b>	<b>0.03</b>	<b>41.38</b>
<b>State Total</b>	<b>0.79</b>	<b>1,310.79</b>	<b>0.03</b>	<b>50.87</b>

Table 4-32: Fuel Combustion Emissions – Residential – Natural Gas

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	5.80	7,786.99	0.34	455.62
DuPage	1.01	1,354.64	0.06	79.26
Grundy Twps	0.01	19.30	0.00	1.13
Kane	0.53	704.95	0.03	41.25
Kendall Twps	0.05	65.03	0.00	3.81
Lake	0.73	975.15	0.04	57.06
Will	0.69	932.12	0.04	54.54
<b>Chicago NAA</b>	<b>8.82</b>	<b>11,838.19</b>	<b>0.52</b>	<b>692.66</b>
Madison	0.26	3,43.51	0.01	20.10
St. Clair	0.24	317.58	0.01	18.58
<b>Metro-East NAA</b>	<b>0.49</b>	<b>661.09</b>	<b>0.03</b>	<b>38.68</b>
<b>Attainment Area</b>	<b>3.93</b>	<b>5,266.40</b>	<b>0.23</b>	<b>308.14</b>
<b>State Total</b>	<b>13.24</b>	<b>17,765.67</b>	<b>0.77</b>	<b>1,039.48</b>

Table 4-33: Fuel Combustion Emissions – Residential – Wood Firelog

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	26.56	0.00	136.75
DuPage	0.00	10.74	0.00	55.28
Grundy Twps	0.00	0.17	0.00	0.88
Kane	0.00	5.20	0.00	26.76
Kendall Twps	0.00	0.51	0.00	2.64
Lake	0.00	7.36	0.00	37.89
Will	0.00	6.86	0.00	35.33
<b>Chicago NAA</b>	<b>0.00</b>	<b>57.40</b>	<b>0.00</b>	<b>295.54</b>
Madison	0.00	0.95	0.00	4.89
St. Clair	0.00	0.92	0.00	4.73
<b>Metro-East NAA</b>	<b>0.00</b>	<b>1.87</b>	<b>0.00</b>	<b>9.61</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>27.50</b>	<b>0.00</b>	<b>141.57</b>
<b>State Total</b>	<b>0.00</b>	<b>86.77</b>	<b>0.00</b>	<b>446.72</b>

Table 4-34: Fuel Combustion Emissions – Residential – Wood Fireplaces

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	35.48	0.00	374.97
DuPage	0.00	13.48	0.00	138.52
Grundy Twps	0.00	0.16	0.00	1.35
Kane	0.00	5.01	0.00	41.75
Kendall Twps	0.00	0.52	0.00	4.35
Lake	0.00	7.37	0.00	61.38
Will	0.00	6.55	0.00	54.59
<b>Chicago NAA</b>	<b>0.00</b>	<b>68.58</b>	<b>0.00</b>	<b>676.91</b>
Madison	0.00	4.71	0.00	57.51
St. Clair	0.00	4.92	0.00	60.10
<b>Metro-East NAA</b>	<b>0.00</b>	<b>9.63</b>	<b>0.00</b>	<b>117.61</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>81.05</b>	<b>0.00</b>	<b>1,018.41</b>
<b>State Total</b>	<b>0.00</b>	<b>159.26</b>	<b>0.00</b>	<b>1,812.94</b>

Table 4-35: Fuel Combustion Emissions – Residential – Wood Furnaces

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.22	0.00	1.42
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.22</b>	<b>0.00</b>	<b>1.42</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>74.45</b>	<b>0.00</b>	<b>483.96</b>
<b>State Total</b>	<b>0.00</b>	<b>74.67</b>	<b>0.00</b>	<b>485.38</b>

Table 4-36: Fuel Combustion Emissions – Residential – Wood Hydronic Heaters

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.18	0.00	6.82
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.18</b>	<b>0.00</b>	<b>6.82</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>65.40</b>	<b>0.00</b>	<b>2,448.94</b>
<b>State Total</b>	<b>0.00</b>	<b>65.58</b>	<b>0.00</b>	<b>2,455.76</b>

Table 4-37: Fuel Combustion Emissions – Residential – Wood Outdoor

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	3.67	0.00	26.68
Grundy Twps	0.00	0.06	0.00	0.42
Kane	0.00	1.77	0.00	12.86
Kendall Twps	0.00	0.43	0.00	3.14
Lake	0.00	2.71	0.00	19.67
Will	0.00	2.29	0.00	16.65
<b>Chicago NAA</b>	<b>0.00</b>	<b>10.93</b>	<b>0.00</b>	<b>79.42</b>
Madison	0.00	0.74	0.00	5.40
St. Clair	0.00	0.83	0.00	6.05
<b>Metro-East NAA</b>	<b>0.00</b>	<b>1.57</b>	<b>0.00</b>	<b>11.44</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>11.03</b>	<b>0.00</b>	<b>80.15</b>
<b>State Total</b>	<b>0.00</b>	<b>23.53</b>	<b>0.00</b>	<b>171.01</b>

Table 4-38: Fuel Combustion Emissions – Residential – Wood Stoves

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	13.16	0.00	96.21
DuPage	0.00	2.63	0.00	22.60
Grundy Twps	0.00	0.07	0.00	0.76
Kane	0.00	2.13	0.00	24.39
Kendall Twps	0.00	0.21	0.00	2.48
Lake	0.00	3.13	0.00	35.86
Will	0.00	2.79	0.00	31.85
<b>Chicago NAA</b>	<b>0.00</b>	<b>24.12</b>	<b>0.00</b>	<b>214.16</b>
Madison	0.00	3.95	0.00	41.32
St. Clair	0.00	4.03	0.00	43.11
<b>Metro-East NAA</b>	<b>0.00</b>	<b>7.99</b>	<b>0.00</b>	<b>84.43</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>93.96</b>	<b>0.00</b>	<b>1,109.29</b>
<b>State Total</b>	<b>0.00</b>	<b>126.07</b>	<b>0.00</b>	<b>1,407.88</b>

Table 4-39: Fuel Marketing Emissions – Bulk Plants

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
Will	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00
St. Clair	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-40: Fuel Marketing Emissions – Bulk Terminals

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
Will	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00
St. Clair	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>

All emissions are accounted for in the point source category.

Table 4-41: Fuel Marketing Emissions – Stage I

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	1.57	534.60
DuPage	0.43	145.47
Grundy Twps	0.01	3.70
Kane	0.20	66.74
Kendall Twps	0.02	5.95
Lake	0.29	97.48
Will	0.32	108.23
<b>Chicago NAA</b>	<b>2.83</b>	<b>962.18</b>
Madison	0.15	52.44
St. Clair	0.15	50.69
<b>Metro-East NAA</b>	<b>0.30</b>	<b>103.13</b>
<b>Attainment Area</b>	<b>2.61</b>	<b>887.27</b>
<b>State Total</b>	<b>5.74</b>	<b>1,952.58</b>

Table 4-42: Fuel Marketing Emissions – Stage II – Diesel

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.41	127.78
DuPage	0.11	34.76
Grundy Twps	0.00	0.86
Kane	0.05	15.72
Kendall Twps	0.00	1.41
Lake	0.08	23.65
Will	0.08	24.71
<b>Chicago NAA</b>	<b>0.73</b>	<b>228.90</b>
Madison	0.05	14.22
St. Clair	0.04	13.31
<b>Metro-East NAA</b>	<b>0.09</b>	<b>27.52</b>
<b>Attainment Area</b>	<b>0.62</b>	<b>192.33</b>
<b>State Total</b>	<b>1.44</b>	<b>448.75</b>

Table 4-43: Fuel Marketing Emissions – Stage II – Gasoline

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	3.10	921.39
DuPage	0.76	217.97
Grundy Twps	3.02	6.08
Kane	0.38	110.57
Kendall Twps	0.03	9.80
Lake	0.53	154.89
Will	0.56	165.85
<b>Chicago NAA</b>	<b>5.39</b>	<b>1,586.55</b>
Madison	0.35	101.16
St. Clair	0.32	94.72
<b>Metro-East NAA</b>	<b>0.67</b>	<b>195.87</b>
<b>Attainment Area</b>	<b>6.57</b>	<b>1,739.74</b>
<b>State Total</b>	<b>12.63</b>	<b>3,522.16</b>

Table 4-44: Fuel Marketing Emissions – Storage Tank Breathing

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	2.18	739.69
DuPage	0.29	201.27
Grundy Twps	0.02	5.12
Kane	0.27	92.34
Kendall Twps	0.02	8.23
Lake	0.40	134.88
Will	0.44	149.75
<b>Chicago NAA</b>	<b>3.92</b>	<b>1,331.29</b>
Madison	0.20	68.30
St. Clair	0.19	66.02
<b>Metro-East NAA</b>	<b>0.40</b>	<b>134.32</b>
<b>Attainment Area</b>	<b>3.03</b>	<b>1,031.35</b>
<b>State Total</b>	<b>7.35</b>	<b>2,496.96</b>

Table 4-45: Fuel Marketing Emissions – Tank Truck Leaks

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.12	43.68
DuPage	0.03	11.89
Grundy Twps	0.00	0.30
Kane	0.02	5.45
Kendall Twps	0.00	0.49
Lake	0.02	7.96
Will	0.03	8.84
<b>Chicago NAA</b>	<b>0.22</b>	<b>78.61</b>
Madison	0.01	4.03
St. Clair	0.01	3.90
<b>Metro-East NAA</b>	<b>0.02</b>	<b>7.93</b>
<b>Attainment Area</b>	<b>0.17</b>	<b>60.90</b>
<b>State Total</b>	<b>0.42</b>	<b>147.45</b>

Table 4-46: Gas Exploration Emissions

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Table 4-47: Gas Production Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>State Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Table 4-48: Graphic Arts Emissions

County	VOM (tpd)	VOM (tpy)
Cook	7.04	1,828.70
DuPage	2.47	642.70
Grundy Twps	0.00	0.50
Kane	1.22	317.48
Kendall Twps	0.05	11.86
Lake	1.00	259.89
Will	0.82	213.86
<b>Chicago NAA</b>	<b>12.61</b>	<b>3,274.99</b>
Madison	0.15	38.79
St. Clair	0.20	50.85
<b>Metro-East NAA</b>	<b>0.35</b>	<b>89.65</b>
<b>Attainment Area</b>	<b>3.51</b>	<b>910.93</b>
<b>State Total</b>	<b>16.46</b>	<b>4,275.57</b>

Table 4-49: Incineration Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	1.86	677.46	1.22	442.91
DuPage	0.33	120.92	0.22	79.06
Grundy Twps	0.01	1.93	0.00	1.26
Kane	0.19	69.51	0.12	45.45
Kendall Twps	0.02	7.27	0.01	4.75
Lake	0.25	91.46	0.16	59.80
Will	0.23	84.96	0.15	56.09
<b>Chicago NAA</b>	<b>2.89</b>	<b>1,053.51</b>	<b>1.89</b>	<b>689.32</b>
Madison	0.09	34.51	0.06	22.56
St. Clair	0.00	0.00	0.06	22.10
<b>Metro-East NAA</b>	<b>0.09</b>	<b>34.51</b>	<b>0.12</b>	<b>44.66</b>
<b>Attainment Area</b>	<b>1.47</b>	<b>534.96</b>	<b>0.96</b>	<b>350.87</b>
<b>State Total</b>	<b>4.46</b>	<b>1,622.97</b>	<b>2.98</b>	<b>1,084.84</b>

Table 4-50: Industrial Surface Coating Emissions – Maintenance Coatings

County	VOM (tpd)	VOM (tpy)
Cook	6.05	1,571.51
DuPage	1.08	280.49
Grundy Twps	0.02	4.48
Kane	0.62	161.23
Kendall Twps	0.06	16.86
Lake	0.82	212.15
Will	0.80	208.88
<b>Chicago NAA</b>	<b>9.45</b>	<b>2,455.62</b>
Madison	0.31	80.04
St. Clair	0.30	79.15
<b>Metro-East NAA</b>	<b>0.61</b>	<b>159.20</b>
<b>Attainment Area</b>	<b>4.80</b>	<b>1,245.78</b>
<b>State Total</b>	<b>14.86</b>	<b>3,860.59</b>

Table 4-51: Industrial Surface Coating Emissions – Other Special Purpose Coatings

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.64	166.76
DuPage	0.11	29.76
Grundy Twps	0.00	0.48
Kane	0.07	17.11
Kendall Twps	0.01	1.79
Lake	0.09	22.51
Will	0.09	22.17
<b>Chicago NAA</b>	<b>1.00</b>	<b>260.58</b>
Madison	0.03	8.49
St. Clair	0.03	8.40
<b>Metro-East NAA</b>	<b>0.07</b>	<b>16.89</b>
<b>Attainment Area</b>	<b>0.51</b>	<b>132.19</b>
<b>State Total</b>	<b>1.58</b>	<b>409.66</b>

Table 4-52: Marine Vessel Loading and Transport Emissions

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.41	127.58
DuPage	0.00	0.00
Grundy Twps	0.02	7.29
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
Will	0.42	131.22
<b>Chicago NAA</b>	<b>0.85</b>	<b>266.09</b>
Madison	0.56	174.96
St. Clair	0.02	7.29
<b>Metro-East NAA</b>	<b>0.58</b>	<b>182.25</b>
<b>Attainment Area</b>	<b>2.09</b>	<b>657.20</b>
<b>State Total</b>	<b>3.53</b>	<b>1,105.54</b>

Table 4-53: Oil and Gas Production Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.18	65.29	0.54	196.45
St. Clair	0.03	9.55	0.08	28.43
<b>Metro-East NAA</b>	<b>0.21</b>	<b>74.84</b>	<b>0.62</b>	<b>224.88</b>
<b>Attainment Area</b>	<b>23.16</b>	<b>8,420.36</b>	<b>66.54</b>	<b>2,4194.63</b>
<b>State Total</b>	<b>23.36</b>	<b>8,495.21</b>	<b>67.15</b>	<b>24,419.51</b>

Table 4-54: Oil Exploration Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
Will	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.00</b>
Madison	0.02	6.21
St. Clair	0.00	0.91
<b>Metro-East NAA</b>	<b>0.02</b>	<b>7.11</b>
<b>Attainment Area</b>	<b>8.28</b>	<b>3,010.65</b>
<b>State Total</b>	<b>8.30</b>	<b>3,017.77</b>

Table 4-55: Open Burning Emissions – Land Clearing

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.38	0.00	0.88
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.38</b>	<b>0.00</b>	<b>0.88</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.76</b>	<b>138.30</b>	<b>1.76</b>	<b>320.85</b>
<b>State Total</b>	<b>0.76</b>	<b>138.68</b>	<b>1.77</b>	<b>321.73</b>

Table 4-56: Open Burning Emissions – Prescribed Burning

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	0.00	133.48	0.00	2,263.49
DuPage	0.00	66.82	0.00	1,259.89
Grundy Twps	0.00	5.61	0.00	81.03
Kane	0.00	56.18	0.00	940.09
Kendall Twps	0.00	2.62	0.00	55.57
Lake	0.00	72.66	0.00	1,156.46
Will	0.00	62.17	0.00	998.21
<b>Chicago NAA</b>	<b>0.00</b>	<b>399.54</b>	<b>0.00</b>	<b>6,754.72</b>
Madison	0.00	21.17	0.00	407.64
St. Clair	0.00	22.59	0.00	363.48
<b>Metro-East NAA</b>	<b>0.00</b>	<b>43.76</b>	<b>0.00</b>	<b>771.12</b>
<b>Attainment Area</b>	<b>0.72</b>	<b>2,405.85</b>	<b>10.51</b>	<b>36,964.39</b>
<b>State Total</b>	<b>0.72</b>	<b>2,849.14</b>	<b>10.51</b>	<b>44,490.23</b>

Table 4-57: Open Burning Emissions – Residential Household Waste

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	1.36	0.01	1.94
DuPage	0.00	0.24	0.00	0.35
Grundy Twps	0.01	1.89	0.01	2.70
Kane	0.03	9.92	0.04	14.15
Kendall Twps	0.01	3.04	0.01	4.33
Lake	0.01	4.66	0.02	6.64
Will	0.04	14.19	0.06	20.24
<b>Chicago NAA</b>	<b>0.10</b>	<b>35.29</b>	<b>0.14</b>	<b>50.35</b>
Madison	0.05	18.46	0.07	26.33
St. Clair	0.04	13.34	0.05	19.03
<b>Metro-East NAA</b>	<b>0.09</b>	<b>31.79</b>	<b>0.12</b>	<b>45.36</b>
<b>Attainment Area</b>	<b>1.88</b>	<b>681.83</b>	<b>2.68</b>	<b>972.75</b>
<b>State Total</b>	<b>2.06</b>	<b>748.92</b>	<b>2.94</b>	<b>1,068.46</b>

Table 4-58: Open Burning Emissions – Yard Waste – Brush

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.05	0.00	0.21
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.05</b>	<b>0.00</b>	<b>0.21</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>14.35</b>	<b>0.00</b>	<b>54.54</b>
<b>State Total</b>	<b>0.00</b>	<b>14.41</b>	<b>0.00</b>	<b>54.75</b>

Table 4-59: Open Burning Emissions – Yard Waste – Leaves

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.07	0.00	0.31
Lake	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
<b>Chicago NAA</b>	<b>0.00</b>	<b>0.07</b>	<b>0.00</b>	<b>0.31</b>
Madison	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
<b>Metro-East NAA</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Attainment Area</b>	<b>0.00</b>	<b>17.80</b>	<b>0.00</b>	<b>80.38</b>
<b>State Total</b>	<b>0.00</b>	<b>17.87</b>	<b>0.00</b>	<b>80.69</b>

Table 4-60: Pavement Marking Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.01	1.80
DuPage	0.00	0.52
Grundy Twps	0.00	0.02
Kane	0.00	0.41
Kendall Twps	0.00	0.02
Lake	0.00	0.49
Will	0.00	0.60
<b>Chicago NAA</b>	<b>0.03</b>	<b>3.86</b>
Madison	0.00	0.41
St. Clair	0.00	0.37
<b>Metro-East NAA</b>	<b>0.01</b>	<b>0.78</b>
<b>Attainment Area</b>	<b>0.11</b>	<b>16.68</b>
<b>State Total</b>	<b>0.14</b>	<b>21.32</b>

Table 4-61: Portable Fuel Container Emissions – Commercial

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	1.65	411.78
DuPage	0.64	160.75
Grundy Twps	0.00	1.09
Kane	0.30	74.03
Kendall Twps	0.01	3.47
Lake	0.52	129.25
Will	0.24	61.09
<b>Chicago NAA</b>	<b>3.37</b>	<b>841.45</b>
Madison	0.08	20.03
St. Clair	0.07	17.10
<b>Metro-East NAA</b>	<b>0.15</b>	<b>37.12</b>
<b>Attainment Area</b>	<b>1.38</b>	<b>345.47</b>
<b>State Total</b>	<b>4.90</b>	<b>1,224.04</b>

Table 4-62: Portable Fuel Container Emissions – Residential

<b>County</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	7.31	1,827.92
DuPage	2.85	713.58
Grundy Twps	0.02	4.84
Kane	1.31	328.61
Kendall Twps	0.06	15.39
Lake	2.30	573.75
Will	1.08	271.18
<b>Chicago NAA</b>	<b>14.94</b>	<b>3,735.28</b>
Madison	0.36	88.90
St. Clair	0.30	75.89
<b>Metro-East NAA</b>	<b>0.66</b>	<b>164.79</b>
<b>Attainment Area</b>	<b>6.13</b>	<b>1,533.56</b>
<b>State Total</b>	<b>21.73</b>	<b>5,433.62</b>

Table 4-63: Residential Grilling

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	2.86	46.47	2.94	64.63
DuPage	0.57	9.23	0.58	12.84
Grundy Twps	0.01	0.17	0.01	0.24
Kane	0.34	5.51	0.35	7.67
Kendall Twps	0.04	0.58	0.04	0.80
Lake	0.45	7.33	0.46	10.20
Will	0.45	7.34	0.46	10.21
<b>Chicago NAA</b>	<b>4.72</b>	<b>76.63</b>	<b>4.85</b>	<b>106.58</b>
Madison	0.21	3.43	0.22	4.77
St. Clair	0.18	3.00	0.19	4.17
<b>Metro-East NAA</b>	<b>0.40</b>	<b>6.43</b>	<b>0.41</b>	<b>8.94</b>
<b>Attainment Area</b>	<b>3.04</b>	<b>49.43</b>	<b>3.13</b>	<b>68.75</b>
<b>State Total</b>	<b>8.15</b>	<b>132.49</b>	<b>8.38</b>	<b>184.28</b>

Table 4-64: Solvent Cleaning Emissions

County	VOM (tpd)	VOM (tpy)
Cook	11.75	3,698.49
DuPage	3.69	1,159.39
Grundy Twps	0.04	14.00
Kane	1.20	373.57
Kendall Twps	0.10	32.08
Lake	1.68	521.20
Will	1.27	395.04
<b>Chicago NAA</b>	<b>19.73</b>	<b>6,193.76</b>
Madison	0.64	218.89
St. Clair	0.45	140.94
<b>Metro-East NAA</b>	<b>1.09</b>	<b>359.83</b>
<b>Attainment Area</b>	<b>12.13</b>	<b>3,813.40</b>
<b>State Total</b>	<b>32.96</b>	<b>10,367.00</b>

Table 4-65: Structure Fire Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.07	6.69	0.57	52.54
DuPage	0.00	0.42	0.04	3.28
Grundy Twps	0.00	0.01	0.00	0.05
Kane	0.00	0.36	0.03	2.79
Kendall Twps	0.00	0.03	0.00	0.20
Lake	0.00	0.46	0.04	3.59
Will	0.00	0.39	0.03	3.09
<b>Chicago NAA</b>	<b>0.09</b>	<b>8.34</b>	<b>0.71</b>	<b>65.53</b>
Madison	0.00	0.27	0.02	2.11
St. Clair	0.00	0.40	0.03	3.12
<b>Metro-East NAA</b>	<b>0.01</b>	<b>0.66</b>	<b>0.06</b>	<b>5.22</b>
<b>Attainment Area</b>	<b>0.05</b>	<b>4.59</b>	<b>0.39</b>	<b>36.03</b>
<b>State Total</b>	<b>0.15</b>	<b>13.59</b>	<b>1.16</b>	<b>106.78</b>

Table 4-66: Waste Water Treatment Emissions – POTWs

County	VOM (tpd)	VOM (tpy)
Cook	0.41	147.93
DuPage	0.04	12.90
Grundy Twps	0.00	0.00
Kane	0.02	8.76
Kendall Twps	0.00	0.00
Lake	0.03	11.93
Will	0.02	8.33
<b>Chicago NAA</b>	<b>0.52</b>	<b>189.85</b>
Madison	0.01	4.96
St. Clair	0.01	4.47
<b>Metro-East NAA</b>	<b>0.03</b>	<b>9.43</b>
<b>Attainment Area</b>	<b>0.23</b>	<b>83.02</b>
<b>State Total</b>	<b>0.78</b>	<b>282.31</b>

Table 4-67: Total Area Source Emissions

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	18.29	16,078.01	131.90	44,973.30
DuPage	5.41	3,906.44	29.16	10,589.47
Grundy Twps	0.05	42.18	0.54	256.50
Kane	2.45	1,800.68	15.52	5,885.93
Kendall Twps	0.19	127.68	1.41	514.01
Lake	4.02	2,783.26	20.08	7,589.43
Will	1.88	1,746.07	19.20	7,134.88
<b>Chicago NAA</b>	<b>32.29</b>	<b>26,484.32</b>	<b>217.80</b>	<b>76,913.53</b>
Madison	1.01	726.87	9.25	3,410.92
St. Clair	0.71	596.44	7.79	2,882.38
<b>Metro-East NAA</b>	<b>1.71</b>	<b>1,323.31</b>	<b>17.03</b>	<b>6,293.30</b>
<b>Attainment Area</b>	<b>41.98</b>	<b>23,842.55</b>	<b>300.61</b>	<b>132,596.69</b>
<b>State Total</b>	<b>75.98</b>	<b>51,650.19</b>	<b>535.45</b>	<b>215,803.51</b>

## 5 Mobile Sources

A mobile source of air pollution is a self-propelled or portable emitter of air pollutants. Emissions are generated by the engines or motors that power such sources. Most mobile sources, except jet or turboprop aircraft, are powered by internal combustion piston engines and nearly all use liquid fuels. Gaseous fuels, such as compressed natural gas (CNG) or liquefied petroleum gas (LPG), have a very small fraction of the motor fuel market in Illinois. Solid fuels have not been used by mobile sources in significant amounts since railroads retired their coal-powered steam locomotives in the 1950s.

For inventory and planning purposes, mobile sources are divided into two major categories.

1. On-road mobile sources (e.g., motor vehicles such as cars, vans, trucks, buses and motorcycles) used for transportation of goods and passengers on roads and streets
2. Off-road mobile sources including:
  - Modes of powered transportation that do not use roads, such as aircraft, trains, ships and boats, and motor vehicles used off-road; and
  - Self-propelled or portable motorized machines or equipment not used for transportation, ranging from construction equipment and farm tractors to lawn mowers and hand-held power weed choppers.

All on-road mobile sources are self-propelled. Some off-road mobile sources (e.g., farm tractors) are self-propelled, but many off-road sources are not. A gasoline-powered chainsaw is a familiar example of a non-self-propelled off-road mobile source. Not all movable or portable emission sources are mobile sources, however. A small truck-portable cement or hot-mix asphalt plant, for example, may be set up near a construction or road-building site. Such plants are classified as stationary sources, not mobile sources, for two reasons: (1) they may operate for weeks or months at a single location, and (2) the trucks that move the plants do not supply power for them.

Not all internal combustion or turbine engines are mobile sources. Fixed internal combustion engines are classified as stationary sources.

There are three categories of mobile source emissions:

- Exhaust or tailpipe emissions, which result from the combustion of fuel in the source's engine
- Evaporative emissions, which result from evaporation of fuel from the engine or its fuel system; and
- Refueling emissions

Exhaust emissions are the result of fuel combustion and occur only when the engine is running.

Evaporative emissions are VOM only and are continuously emitted from an engine's fuel system, whether the engine is running or not. Evaporative and exhaust VOM emissions were calculated separately for most mobile source categories in this inventory, but for purposes of this report they have been combined. Evaporative emissions do not include VOM emissions that occur during refueling.

Refueling emissions are a third category of mobile source emissions. Refueling emissions are entirely VOM. Although they result from the evaporation of fuel, they are distinct from, and not directly related to, evaporative emissions as defined above.

Refueling emissions have two subcomponents:

- Displacement emissions. These occur when new fuel is transferred into a partly filled tank (be it a service station storage tank, a portable fuel container or gas can, or a vehicle or engine's fuel tank), displacing the air in the tank and forcing that vapor-rich air out the inlet pipe or other vent. There are two stages of displacement emissions:
  - "Stage I" emissions occur when the underground storage tanks at a service station are being refilled;
  - "Stage II" emissions occur when a motor vehicle (or gas can) is being refueled.
- Spill emissions. These occur when drops of fuel drip or splash on the ground during or after refueling and evaporate away.

Refueling emissions from on-road sources occur almost entirely at commercial or private service stations and have been included in the area source category.

Off-road sources also have refueling emissions. Some off-road sources (e.g., locomotives, aircraft, and boats) are refueled at fixed locations. However, many small non-highway sources (e.g., lawnmowers) are refueled where they are used from mobile or portable tanks or fuel containers. In this inventory, refueling emissions from off-road categories (except aircraft refueling) are not reported separately from exhaust and evaporative emissions, but rather are included in the reported overall off-road VOM emissions. Emissions from portable fuel containers are included in the area source category.

## ***5.1 On-Road Mobile Source Inventory***

The inventory of on-road mobile source emissions contains Illinois EPA's estimates of the amounts of NO<sub>x</sub> and VOM from highway vehicles statewide by county as calculated using USEPA's MOVES2014a model. The MOVES model allows data to be pre-aggregated to different levels. Pre-aggregating data at a higher level than hourly reduces the time necessary for a calculation. An hourly run may take hours for a single county. The calculation for all pollutants other than NO<sub>x</sub> and VOM had the data pre-aggregated to the annual level. Pre-aggregating of NO<sub>x</sub> and VOM emissions is not allowed in the MOVES model. The estimates given here for on-road sources do not

include refueling emissions. On-road motor vehicle refueling emissions are found in Section 4.

### **5.1.1 On-Road Motor Vehicle Types**

Emissions are reported for the vehicle types for which the MOVES emission factor model reports emissions for the submittal of data to USEPA. The vehicle types used in this inventory are:

- Buses
  - Intercity
  - School
  - Transit
- Cars
- Motor Homes
- Motorcycles
- Trucks
  - Combination Long Haul
  - Combination Short Haul
  - Light Commercial
  - Passenger
  - Refuse
  - Single Unit Long Haul
  - Single Unit Short Haul

Different types of vehicles have different emission characteristics. Larger and heavier vehicles emit more than smaller, lighter vehicles using the same fuel. Generally speaking, diesel vehicles also emit less VOM but more NO<sub>x</sub> than their gasoline equivalents.

### **5.1.2 Model Input Data**

The MOVES model allows the use to input various data used to calculate emissions into the model's database. If the user is sufficiently skilled, he can enter data directly into the database. Another method to import data into the database is to create a spreadsheet that includes multiple tabs. Each of those tabs represents a different table in the database. An XML file is created that tells MOVES which spreadsheet to use and which tabs of the spreadsheet are to be imported. This is the methodology the Illinois EPA used. A spreadsheet was created for each county and was imported into the database. The tabs of the spreadsheet and a description of the type of data in the tab are described in the table below.

Table 5-1: User Supplied Data for MOVES Model

<b>Spreadsheet Tab</b>	<b>Description of Data in Tab</b>
Age Distribution	The fraction of vehicles of a certain age for a given vehicle type.
Average Speed Distribution	The fraction of traffic for a given vehicle type, road type, hour of day and speed bin.
Day VMT Fraction	The fraction of VMT for a given vehicle type, month, road type and day.
Fuel Formulation	The RVP, sulfur level, ethanol volume, aromatic content, olefin content, benzene content of a fuel.
Fuel Supply	The market share of a given fuel for a particular month.
Fuel Usage Fraction	The fraction of each fuel type used in a given vehicle type
Hour VMT Fraction	The fraction of VMT for a given vehicle type, road type, day and hour.
HPMS VType	VMT for a given vehicle type
I & M Coverage	Type of program, inspection frequency, applicable model years, compliance factor. This data was provided only for the counties that are in a nonattainment area.
Month VMT Fraction	The fraction of VMT for a given vehicle type and month.
Road Type	The fraction of ramp traffic for a given road type.
Road Type Distribution	The fraction of VMT for a given vehicle type and road type.
Source Type	Number of vehicles for a given vehicle type.
Zone Month Hour	The temperature and relative humidity for a given month and hour of the day.

This information, and other data internal to MOVES (e.g., emission factors) was then used by the MOVES model to calculate emissions.

### 5.1.3 On-Road Mobile Source Emissions Summary

Table 5-2 is a summary of the on-road mobile source emissions in tons per year. Detailed tables of on-highway mobile source emissions are given in the appendices.

Table 5-2: On-Road Mobile Source Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	96.86	33,589.66	44.80	16,099.08
DuPage	24.11	8,526.57	10.75	3,962.57
Grundey Twps	0.65	221.85	0.24	84.06
Kane	11.97	4,232.85	5.78	2,133.21
Kendall Twps	1.10	383.26	0.57	204.05
Lake	17.14	6,057.95	7.82	2,933.88
Will	18.25	6,309.72	7.77	2,753.53
<b>Chicago NAA</b>	<b>170.08</b>	<b>59,321.86</b>	<b>77.73</b>	<b>28,170.39</b>
Madison	9.76	3,361.70	3.94	1,287.09
St. Clair	9.18	3,158.39	3.75	1,224.84
<b>Metro-East NAA</b>	<b>18.94</b>	<b>6,520.09</b>	<b>7.69</b>	<b>2,511.94</b>
<b>Attainment Area</b>	<b>151.56</b>	<b>51,749.85</b>	<b>66.77</b>	<b>22,403.64</b>
<b>State Total</b>	<b>340.57</b>	<b>117,591.80</b>	<b>152.19</b>	<b>53,085.96</b>

## 5.2 Off-Road Mobile Source Inventory

Off-road modes of transportation include trains (i.e., locomotives), aircraft, ships and boats, and motor vehicles used off-road. Several factors make off-road emissions important in Illinois. Illinois is at the heart of commercial aviation and the railroad network in the United States and much of the waterborne commerce originates in or passes through Illinois waters. In particular, the Chicago and the St. Louis area are both major centers of air and rail traffic. O'Hare Airport in Chicago is one of the busiest in the world. Waterborne commerce on the Illinois, Mississippi, and Ohio Rivers and on Lake Michigan is considerable, and the state is well supplied with rivers and lakes where much recreational boating takes place.

### 5.2.1 Railroad Locomotives

Rail traffic in Illinois is powered almost entirely by diesel locomotives. Most rail traffic in Illinois is freight, but there are several major Amtrak passenger routes in Illinois and an extensive diesel-powered commuter rail network (Metra) centered on Chicago. The major (Class I) railroads – Burlington Northern, Santa Fe, Canadian National, Canadian Pacific, CSX, Kansas City Southern, Norfolk Southern, and Union Pacific – all operate in Illinois, and most rail traffic is on their routes. There are also nearly 40 regional and short lines in the state. Most of these smaller railroads are very small – a few miles of track and an engine or two – but some have several hundred miles of track in the state and transport millions of tons of freight. There are also 95 rail yards in Illinois.

### 5.2.1.1 Calculation of Emissions

A staff member from Illinois EPA was intimately involved with the USEPA to calculate emissions from locomotives for calendar year 2016. The 2017 fuel use from USEPA was then used in conjunction with the previously calculated inventory to obtain the 2017 emissions. An additional effort was undertaken to obtain fuel use from Metra and Amtrak. These sources of emissions had never been included in an inventory. Additional work was also done to improve the accuracy of the number of rail yards and the number and type of locomotives in those yards. Based on all this work, mainly by Matt Harrell of the Illinois EPA, the inventory for locomotive emissions saw the greatest improvement of the inventory.

### 5.2.1.2 Railroad Locomotive Emissions

The following table represents the emissions of railroad locomotives.

Table 5-3: Railroad Locomotive Emissions

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	21.38	6,884.51	1.13	366.32
DuPage	4.84	1,577.44	0.24	77.22
Grundy Twps	0.22	79.64	0.01	3.67
Kane	2.45	812.78	0.12	38.55
Kendall Twps	0.07	26.76	0.00	1.23
Lake	5.12	1,546.34	0.26	76.86
Will	5.59	1,890.06	0.29	97.23
<b>Chicago NAA</b>	<b>39.67</b>	<b>12,817.52</b>	<b>2.04</b>	<b>661.08</b>
Madison	1.81	662.05	0.10	35.37
St. Clair	1.84	671.97	0.11	38.72
<b>Metro-East NAA</b>	<b>3.65</b>	<b>1,334.02</b>	<b>0.20</b>	<b>74.09</b>
<b>Attainment Area</b>	<b>64.42</b>	<b>23,377.25</b>	<b>3.07</b>	<b>1,113.91</b>
<b>State Total</b>	<b>107.74</b>	<b>37,528.79</b>	<b>5.32</b>	<b>1,849.08</b>

### 5.2.2 Aircraft

This inventory deals with aircraft emissions at Public Use Airports and military airfields in Illinois. There are many small, private airstrips and restricted landing areas scattered around the state. These airstrips are not public use in that they are not open to the flying public. Data, in general, is not available for these private airstrips, but few have more than a handful of operations a month involving small piston engine aircraft which results in extremely negligible emissions. Emissions from these private airstrips have not been included in the inventory.

### 5.2.2.1 Aircraft Description

The FAA recognizes four categories of aircraft operations:

- Air Carrier or Commercial operations: large aircraft capable of carrying more than 60 passengers or 18,000 pounds cargo, i.e., scheduled major airline operations.
- Air Taxi operations: smaller aircraft than air carrier, i.e., small-scale passenger operations.
- General Aviation: all other non-military aircraft operations including private, business, and civilian government operations.
- Military: all operations by military aircraft.

The FAA collects and publishes statistics on these categories for many airports nationwide. Large commercial airports usually have detailed information on aircraft operations by various aircraft makes and models and sometimes even engine types.

There are two basic types of aircraft engines:

- Turbine, turboprop, or turbojet engines which power virtually all military and commercial and many business aircraft. These use jet fuel, a kerosene blend of low volatility.
- Piston engines which power most small general aviation aircraft, private planes, and some business aircraft. These use a special high-octane aviation gasoline.

These aircraft operate chiefly in five modes:

- Taxi/Idle: at very low power when idling or during taxiing before taking off or after landing.
- Takeoff: at full power during takeoff until the aircraft is about 500 feet above the ground.
- Climbout: at slightly reduced power during which the aircraft climbs to its cruising altitude.
- Cruise: at further reduced power level at cruise where the aircraft maintains a constant speed and altitude.
- Approach: at a moderate to low power level during descent and the approach to landing.

Cruising emissions are not included in the inventory.

### 5.2.2.2 Estimating Emissions from Aircraft Operations

Emission factors for aircraft are usually expressed as mass of pollutant per LTO and are derived from measurements made by engine manufacturers. The emission factor for a given aircraft is a function of the make and model of the aircraft and its engine(s), the number of engines on the aircraft, the fuel flow rate for each mode, and the time the aircraft spends in each mode.

Emissions are calculated by summing the emission factors from each of the four modes of operation (taxi, takeoff, climbout, and approach) to obtain a single emission factor for a single LTO. This value is then multiplied by the number of LTOs for the given aircraft/engine type to obtain emissions. This calculation was performed using EDMS (Version 5.1.3) with LTO data provided by USEPA. While EDMS is not the current model for aircraft emissions, there is significant cost for the up-to-date model, AEDT. In using EDMS, emission factors for engines were assumed to be the same as they have in the past. LTO data from USEPA included a few engines that were not in the EDMS database. Using the ability to add new engines in EDMS, these engines and their associated emission factors were added to EDMS using emission factors from the ICAO Aircraft Engine Emissions Databank.

In addition, APUs are small turbine engines installed in the hulls of many large and medium aircraft to generate electricity and compressed air to keep the aircraft's systems operating when the main engines are off. APUs use jet fuel and generate exhaust emissions like the main engines do. Most aircraft in the commercial category have APUs, but comparatively few air taxi or general aviation aircraft have them. APU emissions were also calculated using EDMS.

Amy Hanson of the FAA contacted the Illinois EPA about whether emissions from O'Hare airport were specifically included in the emissions inventory. The primary concern was about on-going changes at O'Hare and how this would affect emissions. From this interaction, Illinois EPA was able to obtain 2017 LTO data from the FAA on O'Hare airport. This data was used in place of the data provided by USEPA to calculate aircraft emission from O'Hare.

### *5.2.2.3 Aircraft Emissions*

The following table presents the emissions calculated for aircraft for the 2017 inventory.

Table 5-4: Aircraft Emissions

<b>County</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Cook	13.13	5,957.04	2.03	929.70
DuPage	0.01	5.76	0.03	11.46
Grundys Twps	0.00	1.65	0.01	3.56
Kane	0.00	1.17	0.01	2.38
Kendall Twps	0.00	0.01	0.00	0.03
Lake	0.01	3.27	0.02	6.32
Will	0.02	8.89	0.05	18.07
<b>Chicago NAA</b>	<b>13.19</b>	<b>5,977.80</b>	<b>2.15</b>	<b>971.53</b>
Madison	0.01	3.56	0.02	7.17
St. Clair	0.05	19.30	0.05	19.23
<b>Metro-East NAA</b>	<b>0.05</b>	<b>22.87</b>	<b>0.06</b>	<b>26.39</b>
<b>Attainment Area</b>	<b>1.08</b>	<b>491.87</b>	<b>0.69</b>	<b>289.69</b>
<b>State Total</b>	<b>14.32</b>	<b>6,492.54</b>	<b>2.90</b>	<b>1,287.61</b>

### 5.2.3 Commercial Marine Vessels

This category includes large cargo ships, passenger ships, oil tankers, etc., powered by steam or internal combustion engines and used for commercial purposes such as transport of passengers, cargo movement, commercial fishing, and the like. Tugboats and pushboats, both used in harbors and to propel barges on rivers, are included in this category. Emissions for pleasure boats are not included in this category, but rather in the other non-road engines and vehicles category.

Emissions for 2017 were obtained by growing the emission estimates in the 2014 inventory. The Waterborne Commerce Statistics Center's (US Army Corps of Engineers) Waterborne Commerce Statistics Report for Calendar Year 2017 was used. The growth factor between 2014 and 2017 was calculated by using the ratio of the total tonnage shipped for those years for the Illinois, Mississippi and Ohio Rivers. Emissions from ports and activity on Lake Michigan and Lake Calumet were assumed to have a growth factor of 1.

Table 5-5: Commercial Marine Vessel Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	6.73	1,379.17	0.21	42.73
DuPage	0.13	25.83	0.00	0.74
Grundys Twps	0.96	197.38	0.03	5.69
Kane				
Kendall Twps				
Lake	1.45	297.23	0.02	4.46
Will	1.84	377.66	0.05	10.88
<b>Chicago NAA</b>	<b>11.11</b>	<b>2,277.25</b>	<b>0.31</b>	<b>64.50</b>
Madison	2.50	513.05	0.07	14.78
St. Clair	1.57	322.26	0.05	9.28
<b>Metro-East NAA</b>	<b>4.07</b>	<b>835.31</b>	<b>0.12</b>	<b>24.06</b>
<b>Attainment Area</b>	<b>65.08</b>	<b>13,342.42</b>	<b>1.87</b>	<b>384.34</b>
<b>State Total</b>	<b>80.27</b>	<b>16,454.98</b>	<b>2.31</b>	<b>472.90</b>

#### 5.2.4 Other Off-Road Engines and Vehicles

This category includes all other portable motorized equipment, from lawnmowers to forklifts, and farm tractors to earthmoving equipment. Engines are powered by spark-ignition (usually fueled by gasoline) and some by compression ignition (diesels). There are two types of spark-ignition engines: 2-stroke and 4-stroke. The three types of engines, 2-stroke, 4-stroke, and diesel, have very different emission characteristics, so they are treated separately in the inventory. Some off-road emission sources use CNG or LPG as a fuel.

For this inventory, Illinois EPA used the MOVES2014a model from USEPA to estimate off-road emissions by county. Fuel and temperature data previously compiled for on-road sources was also used to calculate off-road emissions. The equipment populations included with MOVES were not modified and were used as they existed in the model.

Emissions calculated for other off-road engines and vehicles for the 2017 inventory are as follows:

Table 5-6: Other Off-Road Engine Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	34.99	9,555.81	33.96	8,978.77
DuPage	10.31	2,725.12	12.04	3,039.92
Grundy Twps	0.36	81.53	0.40	106.19
Kane	7.65	1,867.36	6.18	1,517.77
Kendall Twps	0.63	168.98	0.66	400.51
Lake	8.37	2,165.34	12.37	3,087.79
Will	9.32	2,294.74	6.47	1,631.03
<b>Chicago NAA</b>	<b>71.63</b>	<b>18,858.87</b>	<b>72.09</b>	<b>18,761.97</b>
Madison	4.07	918.72	3.12	807.32
St. Clair	3.31	716.41	2.07	529.16
<b>Metro-East NAA</b>	<b>7.38</b>	<b>1,635.13</b>	<b>5.19</b>	<b>1,336.48</b>
<b>Attainment Area</b>	<b>181.83</b>	<b>34,007.78</b>	<b>90.19</b>	<b>29,439.06</b>
<b>State Total</b>	<b>260.84</b>	<b>54,501.79</b>	<b>167.46</b>	<b>49,537.51</b>

### 5.2.5 Total Off-Road Engine Emissions

The following table is the total of the commercial marine vessels, locomotives, aircraft, and other off-road engine emissions.

Table 5-7: Total Off-Road Engine Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	76.23	23,776.53	37.33	10,317.52
DuPage	15.29	4,334.15	12.32	3,129.34
Grundy Twps	1.55	360.20	0.45	119.10
Kane	10.11	2,681.30	6.30	1,558.71
Kendall Twps	0.70	195.75	0.66	401.77
Lake	14.94	4,012.17	12.66	3,175.43
Will	16.78	4,571.34	6.86	1,757.21
<b>Chicago NAA</b>	<b>135.59</b>	<b>39,931.44</b>	<b>76.59</b>	<b>20,459.08</b>
Madison	8.39	2,097.39	3.31	864.64
St. Clair	6.77	1,729.94	2.27	596.39
<b>Metro-East NAA</b>	<b>15.16</b>	<b>3,827.33</b>	<b>5.57</b>	<b>1,461.03</b>
<b>Attainment Area</b>	<b>312.42</b>	<b>71,219.33</b>	<b>95.82</b>	<b>31,227.00</b>
<b>State Total</b>	<b>463.18</b>	<b>114,978.09</b>	<b>177.99</b>	<b>53,147.11</b>



## **6 Quality Assurance**

### ***6.1 Purpose of the Inventory***

The objective of this emission inventory is to present an accurate and comprehensive account of ozone precursor emissions from point, area, and mobile sources for the entire State of Illinois in accordance with the requirements of the CAA. The ozone precursors included in the inventory are NO<sub>x</sub> and VOM. Emissions presented in the 2017 emission inventory are typical summer day and annual.

### ***6.2 Scope of the Quality Assurance Plan***

The Illinois EPA has implemented quality assurance (QA) procedures and quality control (QC) checks at various stages in the inventory process. The QA preparations involved in the development of the emission inventory were based on the procedures as outlined in the USEPA's publications EPA-450-4-88-023, *Guidance for the Preparation of Quality Assurance Plans for O<sub>3</sub>/CO SIP Emission Inventories* and EPA-450/4-91-022, *Quality Review Guidelines for 1990 Base Year Emission Inventories* and Illinois EPA's document, *Illinois Environmental Protection Agency Point Source Emissions Inventory Quality Assurance/Quality Control (QA/QC) Plan* by the Radian Corporation (November 1991). Details of the QA program are discussed in the following sections.

### ***6.3 Summary of QA Activities***

In general, four basic stages were involved in the preparation of the 2017 emission inventory: planning, data collection, data analysis, and data reporting. Data analyses include estimation of emissions for point sources that failed to report ozone season emissions in their AER. The reporting stage includes the presentation of summer ozone season data and emission estimates as a finished product in the required format. As a first step, the QA program was conceived earlier in the process and was implemented throughout the various stages of inventory development. Second, the collection of data (or representative samples of it) had undergone review for suitability, completeness, and correctness. Next, all the methodologies used in the calculation of missing or unreported emission data and those methodologies used for various data analyses were all reviewed to ensure the inventory of such emission data were appropriate representations of each respective emission category. Lastly, the finished periodic emission inventory product was checked and audited for completeness and accuracy.

### **6.3.1 Inventory and QA Planning**

Illinois EPA's Air Quality Planning Section inventory staff used a QA plan largely based on requirements according to the CAA and USEPA quality assurance and quality control guidance documents. Also, the overall inventory QA plan was influenced by experiences gained in the development of previous inventories.

### **6.3.2 Resource Allocation for QA**

In-house quality assurance activities required a person with experience and authority to carry out QA duties. The QA coordinator interacts directly with the inventory staff or specialists for point, area, and mobile sources. The person responsible for this activity is the manager of the Inventory and Data Support Unit of the Air Quality Planning Section. As of the creation of this inventory, there were three staff under this manager whose jobs are to compile the point source inventory, review AERs, and compile the area source inventory.

### **6.3.3 Schedule and Project Planning**

The Air Quality Planning Section's inventory staff's experience in the compilation of previous inventories was drawn upon in preparing the QA plan for the 2017 emission inventory.

To prepare the 2017 AER data for inventory use, inventory staff reviewed the emission data that was submitted. The experiences in such review were also included as bases in developing the QA plan for this inventory. Many data range checks are built into the CAERS and ISSIS systems. This ensures values entered into the database are within acceptable levels such as those ranges of values for parameters indicated in Section 6.4. Knowledge that such input value ranges are automatically validated contributed to the overall design of the QA plan.

As permits are issued, the emission data contained in the permit and application are compiled into the point source emission inventory by the inventory staff. Each source that is added to the inventory is reviewed for correctness and completeness by the Unit Manager. This review also contributes to the contribution of the overall design of the QA plan.

A review of the results of the AER data became the groundwork for planning and scheduling the QA efforts for the 2017 inventory. Specific key parameters identified in the inventory were tagged as a potential focus for QA work and incorporated in the planning for reviewing the point source emissions data.

The inventory staff charged with the mobile and area source portions of the inventory began their parallel QA efforts to enable a timely completion of the inventory. For on-road and off-road sources, review of emission factors was primarily confined to QA of

the inputs to the appropriate model. The non-road source methodology and emission data were compared with previous studies done on this category.

## **6.4 QA Technical Information**

As noted above, the emission inventory system the DAPC uses contributes to the overall quality assurance aspect for this inventory. The emission inventory data has already been range checked for the following parameters:

- Stack height  $\leq$  1250 feet
- Stack diameter  $\leq$  99.99 feet
- Hours per year  $\leq$  8760
- Peak ozone season hours  $\leq$  2208
- Weeks per year  $\leq$  52
- Peak ozone season weeks  $\leq$  13
- Days per week  $\leq$  7
- Hours per day  $\leq$  24
- Seasonal throughput totals = 100 percent

In addition to the validation of input data ranges, ISSIS and CAERS also perform automated validation of codes such as NAICS and SCC. With such tasks performed, the inventory staff is more focused on reviewing key parameters and other aspects of the inventory that may significantly affect the accurate representation of typical summer weekday emissions.

### **6.4.1 Prioritizing Sources and Data Elements**

The data elements of the 2017 periodic emission inventory were based on the source-reported emissions for 2017. This reported data was deemed more representative compared to the emissions from growing a previous point source inventory. An analysis was performed by comparing the emission level in 2014 and 2017 on a point-by-point basis. With tens of thousands of records statewide to QA for purposes of this inventory, this methodology helped to focus resources towards emission points that were found to have a significant increase or decrease in emissions from 2014 to 2017.

Sources whose summation of emissions from the individual emission units at the source were significantly different than the source-reported total were sent a letter identifying the discrepancy. As revised data was received, it was checked to make sure the error was corrected. This updated data was entered into ICEMAN and used for the inventory.

### **6.4.2 Data Sources and Checking Procedures**

Although the data used in the point source emission inventory came directly from the sources themselves, some data were deemed incorrectly represented and corrected

accordingly. If necessary, all possible sources of information were used in this QA effort, including AERs from previous years, to determine reliability of the data for inclusion in the inventory. The inventory staff assessed all data that were presented and took into account the capabilities and biases of the organization supplying the data, the techniques used to collect the data, and the purpose for which the data had been compiled. All of these provided an overall understanding of the limitations of reported data and served as a guide in choosing the best data for use in the inventory.

All reported data from a source's 2017 AER were checked and entered into CAERS. The point source reported data were reviewed and, in general, found acceptable as most companies had provided the necessary information required by Illinois EPA. Area source data, such as census and meteorological information, landings and takeoffs at airports, etc. came from federal or state government sources and are relatively accurate and found to be appropriate for use in this inventory. Data from high-quality sources are still subjected to QA checks for relevance and suitability for the inventory.

As an example, the previous issue Illinois EPA had with the agricultural field burning category data was reviewed again for 2017 since USEPA's methodology changed. While this methodology seems to continue to over-estimate the amount of acreage burned, the discrepancy was not deemed to be sufficiently of concern and the data was used "as is" from USEPA.

Review of the emission data was generally performed several times in the inventory development process. The inventory staff reviews the data as presented by each source to Illinois EPA. The QA Coordinator, through comparative analysis and other database review/manipulations, sorts and flags suspect emission points and values and returns them to the responsible inventory staff for another round of QA review and scrutiny. Finally, after the consolidated emission results are finalized, the inventory staff performs a last review of emission values for inclusion in the inventory. The second independent QA check is more formal than the other two and is usually done on a sample of the data. The first and third checks cover all data used.

## ***6.5 Data Collection and Analysis***

The following sections describe Illinois EPA's plans in collecting and analyzing emission data and the QA procedures used by the inventory staff in evaluating them.

### **6.5.1 Identification of Emission Sources**

For point sources, all sources that (a) are located in the State of Illinois and (b) are shown to have emissions of NO<sub>x</sub> or VOM are automatically included in the inventory. Illinois EPA is confident all significant point sources are included in ISSIS. The Illinois EPA also identified sources that were known to have operated in 2017 but which did not have their emission data entered into the system by the end of 2017.

The 2014 periodic emission inventory was used as a comparison for all point emission categories in the 2017 inventory. The 2017 area source categories were also checked against the 2014 inventory. All area source and mobile source categories listed in the federal guidance are included in the inventory. Illinois EPA checks MOVES model inputs (particularly temperatures and volatility) and VMT data for completeness, in order to ensure their suitable use in the model.

For area sources, work performed by the USEPA for the 2017 inventory was used to identify additional source categories that may have not been calculated in previous years. This review resulted in the addition of one new area source category, residential grilling. With the USEPA's area source data not necessarily being final at the time of this document, Illinois EPA will continue to monitor the calculation methodology and categories for inclusion in future inventories.

### **6.5.2 Data Quality**

To ensure the emission inventory is of the highest quality, QA procedures were in place for evaluating the quality and reliability of data for use in the inventory. These evaluation processes enable the inventory staff to make informed choices between sources of information, especially if the data from one source differs significantly in comparison with those that were obtained from another source. Also, the evaluation process allows the inventory staff and users of the inventory to make informed judgments about the validity of the emissions in any particular category.

Representative QA actions include checking the base year relevancy of the data; the use of 2017 data where possible, is emphasized. However, if such base year data are unavailable, the most recent reliable data is used and noted accordingly in the inventory documentation.

Data were crosschecked with similar published data. Appropriate caution was taken in the choice of "other published data," especially when such data may have originated from the same source that produced the original data. In such cases, the actual data is not easily verifiable, but some credibility and support is given for such data, especially when an independent organization had chosen to publish such data. Checking 2017 inventory data against those reflected in the past year or years is useful since magnitudes and trends may be verified in this manner.

Some QA actions were more subjective, i.e., the judgment and experience of the inventory staff is important in these evaluations. The professional capabilities and biases, if any, of the suppliers of the data were taken into consideration, including the purpose for which the data were collected. Data organized by government agencies for taxation purposes (e.g., gasoline sales) and industry information on purchases and sales of materials and products (e.g., coal usage at the power plant), were considered of acceptable quality since both entities have a specific incentive to obtain the most accurate information. Data collection techniques, if known, were assessed accordingly. For example, information from plant inspections was considered more reliable than data

from mail surveys. However, unless the inventory staff or the QA Coordinator had any significant comment about one or more of these subjective assessments (for example, when one source of data for a category was chosen over another), such assessments, as a rule, are not part of the inventory documentation.

### **6.5.3 Emission Estimation Methods**

Illinois EPA estimates emissions following the procedures outlined in these USEPA publications:

- EPA-450/4-88-019, Inventory Requirements for Post-1987 Ozone State Implementation Plans, December 1988
- EPA-450/88-021, Procedures for the Preparation of Emission Inventories for Precursors of Ozone: Volume I, Third Edition, December 1999
- EPA-450/4-81-026d (Revised), Procedures for the Preparation of Emission Inventories for Precursors of Ozone: Volume IV: Mobile Sources, July 1989
- AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, January 1995 and supplements

Where specific USEPA guidance was not available, Illinois EPA used generally accepted engineering principles, calculations, and judgment, supplemented by technical information from other sources, in estimating emissions. In all such cases, the method, data, and other relevant information were identified accordingly.

The emission estimates were adjusted to reflect conditions on a typical 2017 summer weekday as follows:

- Point Sources: Emissions were calculated using peak ozone season emission rates from source-submitted 2017 AERs.
- Area Sources: Emissions were calculated using seasonal adjustment factors such as those reflected in USEPA guidance and by adjustments for representative 2017 summertime temperatures and volatility for certain categories (e.g., storage of gasoline and other VOM).

### **6.5.4 Consistency with Other States**

Several conference calls were held for the 2008 inventory development process with the states of Indiana, Michigan, Minnesota, Ohio, and Wisconsin through LADCO to identify the emission factors or calculations methods to be used in calculating emissions from certain area source categories. There have been no significant changes with subsequent inventories to warrant additional calls. Having a consistent approach in calculating area source emissions has been greatly improved since USEPA has been making the data and calculation methodology available before the inventory is to be developed.

### **6.5.5 Calculations and Data Handling**

Computers were employed in all calculations for the inventory. Arithmetic errors are minimized in these calculations. Typographical errors and incomplete algorithms are of concern. The entry of point source emissions from AERs are monitored at different points in the process. Once data from the AER is entered, the emissions from the individual emission units are summed and compared to the reported total. The reports receive another level of inspection when they are reviewed. And finally, the point sources are check by means described elsewhere in this part of the document. Typographical errors should be at a minimum.

Computerized information was stored on the BOA's network and was backed up nightly. Original inventory data continued to be maintained in the database. This data was extracted from the database and was maintained in an Access® database on the network. The Access® database was manipulated to obtain the 2017 point source inventory.

### **6.5.6 Validation Procedures**

Point and area sources were also checked against the list of categories shown in the QA Guidance to ensure all emission categories were covered.

- Data consistency: The input and output data are consistent with USEPA guidance documents as to the (1) area of coverage, (2) pollutants, (3) methodologies, and (4) units of measurement employed.
- Area covered: This inventory was compiled on a statewide basis.
- Pollutants covered: Ozone precursors NOx and VOM were inventoried in accordance with USEPA guidance requirements.
- Double-counting of emissions: This could occur in categories which have both point and area source emissions represented in the inventory (e.g., the dry cleaning category). The category's point source emissions are assumed to be included in the total or gross emissions, which are generally estimated based on a surrogate factor such as population. The net area source emissions are then calculated by subtracting the calculated point source emissions from the total in order to avoid accounting for point source emissions twice. Some other area source categories which have the potential for double counting of emission are Graphic Arts and Commercial/Institutional fuel use. These were reviewed to make sure no double counting occurred in the inventory.
- Methods and units used: This procedure ensures the methods of calculations employed are consistent with USEPA guidance and usage of such units is correct.

## **6.6 Data Handling**

### **6.6.1 Data Coding and Recording**

Coding and recording of data into the ISSIS and CAERS database is done by trained inventory staff and is subject to standard operating procedures (SOPs). Similarly, updates and corrections discovered in the course of QA efforts were updated by the inventory staff. Any changes to the database are monitored and reviewed by the Inventory and Data Support Unit Manager. QA of information was further carried out by the QA Coordinator before any inclusions were considered into the 2017 inventory.

### **6.6.2 Data Tracking**

Illinois EPA keeps its data and calculations mainly on personal computers and/or the BOA's network. Raw data, especially for area sources, are obtained in various forms which are kept in files by the inventory staff for future reference purposes. Such files may include other information (e.g., sample calculations, estimates, sources of information, various relevant notes, and correspondence, etc.) also for reference purposes. Any data in electronic form was backed up so that every file is available for quick recovery and reconstruction of data. All AERs are now imaged after they are reviewed which yields another level of data security.

### **6.6.3 Correcting Data**

When an inventory staff member discovers an error in reported data, the data are corrected in both the extracted data for the inventory and the originating data source. First, the person identifying the error consults with the Inventory and Data Support Unit Manager to determine whether a correction is truly necessary. If a correction is warranted, the person responsible for maintaining the extracted data is notified on what changes to make to that data set. Updates to the originating data set are performed by the inventory staff designated by the Inventory and Data Support Unit Manager.

### **6.6.4 Missing Data**

This applies mainly to point source data. As noted above, missing emission data was not a major problem for Illinois EPA, but point source data have been known to be missing or in error for many small sources, and their absence, while not affecting emission totals, could be significant. For point sources, permit data has been used to obtain estimated values for missing data. In other categories, missing data, if they occurred, were treated as data needing correction and dealt with accordingly. Where any missing data could not be obtained, a note was made of the fact, and suitable values estimated. The methods used to estimate the data is documented in detailed records.

## **6.7 QA Audits**

### **6.7.1 Internal**

The Illinois EPA did not perform a complete internal or agency QA audit during its work on the 2017 inventory. Compilation of the 2017 inventory slightly differs from past inventories. USEPA continues to provide a common set of data (e.g., population, employment, etc.) and procedures for use in compilation of the area source component of the inventory. The Illinois EPA gave preference to available 2017 data since much of USEPA's data was for 2016 or older. The Illinois EPA also gave preference to data sources it had used in the past to maintain a consistent inventory throughout the years.

A review of the initial data in the point source inventory was compared against the annual totals reported on the source's AER. Sources where the difference was greater than 10 tons were reviewed and updated as necessary.

### **6.7.2 External**

The 2017 inventory data was required to be submitted to the USEPA by December 31, 2018. USEPA will be providing preliminary QA reports to the states in 2019. Those reports will be reviewed by Illinois EPA and data corrected as necessary. Based on the past history, any identified problems should be rare and minor. At this time, there does not seem to be a need to change previously calculated emissions or add new area source categories to the inventory.



## 7 Conclusion

This report summarizes and documents Illinois' 2017 inventory of ozone precursor emissions. This report includes emissions for the entire state, plus identification of emissions for the two nonattainment areas of the state and the remaining attainment area. The inventory was developed using actual 2017 emissions and data except in cases where noted.

This document presents the 2017 periodic ozone inventory for both typical summer day and annual emissions for NOx and VOM from point, area, on-road mobile, and off-road mobile sources for the State of Illinois. In producing this document, Illinois EPA has followed the procedures outlined in USEPA's guidance documents pertaining to both preparation and quality assurance of the inventory and therefore believes the inventory to be complete, accurate, and of high quality.

Table 7-1: Emission Summary by Area

Area	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Chicago NAA	413.14	137368.71	416.45	137,348.25
Metro-East NAA	47.39	14790.38	40.01	210,127.34
Attainment Area	733.48	197563.07	546.01	210,127.34
<b>State Total</b>	<b>1194.01</b>	<b>349,722.15</b>	<b>1,002.47</b>	<b>360,798.89</b>

Table 7-2: Statewide Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	26.3	18.7	13.7	10.7
Area	6.4	14.8	53.4	59.8
On-Road	28.5	33.6	15.2	14.7
Off-Road	38.8	32.9	17.8	14.7

Table 7-3: Chicago NAA Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	18.2	8.5	10.6	8.6
Area	7.8	19.3	52.3	56.0
On-Road	41.2	43.2	18.7	20.5
Off-Road	32.8	29.0	18.4	14.9

Table 7-4: Metro-East NAA Emission Contributions (percent)

<b>Category</b>	<b>NOx Daily</b>	<b>NOx Annual</b>	<b>VOM Daily</b>	<b>VOM Annual</b>
Point	24.4	21.1	24.3	22.9
Area	3.6	8.9	42.6	47.2
On-Road	40.0	44.1	19.2	18.9
Off-Road	32.0	25.9	13.9	11.0

Table 7-5: Attainment Area Emission Contributions (percent)

<b>Category</b>	<b>NOx Daily</b>	<b>NOx Annual</b>	<b>VOM Daily</b>	<b>VOM Annual</b>
Point	31.0	25.7	15.2	11.4
Area	5.7	12.1	55.1	63.1
On-Road	20.7	26.2	12.2	10.7
Off-Road	42.6	36.0	17.5	14.9

Table 7-6: Geographic Contributions (percent)

<b>Area</b>	<b>NOx Daily</b>	<b>NOx Annual</b>	<b>VOM Daily</b>	<b>VOM Annual</b>
Chicago NAA	34.6	37.9	41.5	38.1
Metro-East NAA	4.0	4.1	4.0	3.7
Attainment Area	61.4	58.0	54.5	58.2

Appendix A

2017  
Statewide Emissions by Category

Table A-1: Statewide Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Point Sources</b>				
External Fuel Combustion				
Electric Generation				
Coal	103.62	28,099.73	3.92	1,118.72
Distillate Oil	0.05	0.38	0.00	0.00
Natural Gas	6.71	418.79	0.10	13.00
Other	0.00	1.54	0.00	0.02
Industrial				
Coal	7.96	2,750.99	0.10	36.42
Distillate Oil	0.13	19.34	0.00	0.26
Natural Gas	13.64	4,101.74	0.80	242.27
Process Gas	2.35	833.29	0.10	35.05
Residual Oil	0.02	5.65	0.00	0.11
Other	0.10	75.27	0.01	3.96
Commercial/Institutional				
Coal	0.62	191.99	0.01	2.08
Distillate Oil	0.51	12.44	0.01	0.18
Natural Gas	5.05	1,640.61	0.27	81.95
Process Gas	0.07	28.16	0.00	1.54
Residual Oil	0.00	0.00	0.00	0.00
Other	0.04	0.59	0.00	0.01
Space Heating				
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.11	90.32	0.01	4.97
Other	0.00	0.06	0.00	0.00
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	12.63	234.33	0.41	5.97
Landfill Gas	2.32	640.55	0.61	95.15
Natural Gas	29.48	1920.09	2.37	124.41

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	1.97	25.87	0.06	0.85
Distillate Oil	10.24	498.15	0.61	37.18
Natural Gas	40.84	6,432.30	2.77	452.60
Other	0.18	4.59	0.01	1.43
Commercial/Institutional				
Distillate Oil	9.21	255.15	0.48	12.76
Natural Gas	1.34	99.60	0.16	11.92
Other	0.01	0.48	0.00	0.05
Engine Testing				
Diesel	0.92	250.98	0.10	29.75
Distillate Oil	0.59	123.10	0.02	3.79
Jet Fuel	0.01	0.07	0.00	0.00
Other	0.04	2.90	0.05	10.71
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.16	45.25
Ammonia	7.38	79.66	0.14	45.85
Cellulosic Fiber	0.00	0.00	4.46	1,519.10
Fixed Roof Tanks	0.02	6.01	0.05	16.66
Ink			0.43	106.59
Nitric Acid	0.06	20.88		
Paint	0.00	0.02	1.37	387.90
Pharmaceuticals	0.00	1.30	0.30	44.87
Phthalic Anhydride	0.20	78.11	0.63	172.33
Plastics	0.12	34.50	1.73	606.01
Polyethylene	0.01	3.25	0.57	188.78
Pressure Tanks			0.00	0.55
Resins	0.00	0.00	0.05	16.00
Sulfuric Acid	0.00	0.25		
Synthetic Organic Fiber			0.04	12.45
Synthetic Rubber			0.04	11.28

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Urea			0.00	0.14
Varnish			0.03	8.53
Other	1.64	557.03	8.16	2,376.40
Fuel Combustion	2.18	693.43	0.26	90.56
Fugitives	0.00	0.00	1.47	530.46
Food/Agriculture				
Bakeries	0.06	18.22	2.64	814.34
Beer			0.00	0.17
Biodiesel			0.03	8.19
Candy			0.80	214.96
Coffee	0.00	0.03	0.00	0.03
Distilled Spirits	0.10	34.05	0.38	137.20
Ethanol	0.24	77.84	0.30	97.01
Feed Manufacturing	0.10	34.19	0.11	38.77
Grain Elevators	0.21	38.45	0.08	25.27
Milling	0.25	67.32	3.62	1,060.57
Smokehouses	0.01	1.74	0.12	36.39
Starch Manufacturing	0.40	143.01	0.51	128.81
Vegetable Oil	0.02	6.30	8.19	2,775.30
Other	0.72	240.58	9.36	2,838.59
Fuel Combustion	1.70	559.98	0.45	146.94
Fugitives	0.00	0.00	2.27	809.71
Primary Metal Production				
Aluminum			0.00	1.86
By-product Coke	1.02	382.80	0.01	3.63
Ferroalloy	0.00	0.05	0.00	0.09
Steel	1.86	513.26	0.50	123.12
Other	0.00	0.50	0.02	5.06
Fuel Combustion	0.43	139.32	0.03	8.70
Fugitives			0.00	0.00

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Secondary Metal Production				
Aluminum	0.05	14.06	0.22	71.48
Copper	0.00	0.99	0.06	12.34
Gray Iron	0.09	19.02	1.50	340.91
Heat Treating	0.04	10.52	0.17	50.08
Lead	0.00	0.48	0.00	0.42
Lead Battery			0.00	0.10
Steel	0.07	19.22	0.12	27.15
Zinc	0.18	47.93	0.06	15.36
Other	0.06	17.84	0.53	109.46
Fuel Combustion	1.73	525.76	0.16	43.88
Mineral Products				
Asphalt Manufacturing	2.75	271.52	2.58	273.04
Asphalt Roofing	0.02	8.85	0.28	79.45
Brick Manufacturing	0.05	12.24	0.01	3.19
Bulk Materials	0.06	20.00	0.01	1.13
Calcining	1.10	370.76	0.01	2.06
Cement Manufacturing	6.38	1,988.94	1.01	208.04
Concrete Manufacturing	0.01	0.35	0.01	3.11
Glass Manufacturing	9.07	3,179.93	0.29	82.14
Lime Manufacturing	0.17	0.00	0.00	0.00
Sand/Gravel	0.24	85.54	0.02	5.82
Stone Quarrying			0.01	3.71
Other	0.72	167.23	1.10	223.59
Fuel Combustion	1.39	373.32	0.16	24.38
Fugitives			0.05	16.77
Petroleum Industry				
Cooling Towers			0.08	26.90
Desulfurization	0.07	29.33	0.06	20.60
FCCU	1.06	390.97	0.14	45.81
Flares	0.31	98.64	1.30	467.32
Process Heaters	9.32	3,156.46	0.47	158.35

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Waste Water	0.00	0.78	0.45	312.93
Other	0.07	28.67	0.78	268.75
Fugitives	0.03	19.82	2.20	796.31
Paper and Wood Products				
Particleboard	0.01	0.84	0.00	0.28
Plywood			0.00	0.12
Pulpboard			0.02	6.14
Woodworking			0.01	1.49
Other	0.00	0.01	0.31	37.73
Fugitives			0.01	2.16
Rubber and Plastic Products				
Plastic Foam			2.42	812.25
Plastic Products	0.01	1.86	0.99	282.70
Tire Manufacturing	0.00	0.00	1.15	377.24
Other	0.00	0.30	0.44	131.48
Fuel Combustion	0.15	18.91	0.01	0.99
Fabricated Metal Products				
Drum Reclamation	0.00	0.72	0.01	2.85
Plating	0.05	14.62	0.09	24.32
Welding	0.00	0.31	0.01	2.52
Other	0.13	33.09	2.40	576.13
Fuel Combustion	0.50	174.72	0.09	32.69
Fugitives			0.02	3.58
Oil and Gas Production				
Crude Oil			0.19	65.97
Natural Gas	5.08	684.12	0.33	52.75
Other	0.00	2.61	0.02	39.17
Fuel Combustion	0.17	31.19	0.01	2.35
Fugitives			0.26	95.84
Miscellaneous Machinery	0.00	0.77	0.32	74.25
Electrical Equipment	0.01	1.90	0.13	43.24
Transportation Equipment			0.05	18.25

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Health Services				
Crematories	0.02	5.22	0.00	0.33
Sterilizers			0.03	6.38
Other			0.00	0.19
Photographic Film			0.01	0.59
Leather and Leather Products			0.08	15.72
Textile Products			0.01	2.31
Process Cooling			0.22	80.99
In-Process Fuel Use				
Coal	0.01	0.11	0.00	0.04
Natural Gas	0.00	0.48	0.00	1.00
Process Gas	0.00	0.00	0.02	6.30
Other	0.20	76.47	0.00	0.11
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.03	2.60	0.47	126.54
Fuel Combustion	0.08	15.64	0.01	8.47
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.63	163.80
Degreasing	0.00	0.15	1.02	250.91
Dry Cleaning			1.24	306.22
Other			0.00	0.18
Fugitives			0.02	4.67
Surface Coating Operations				
Adhesives	0.00	0.00	0.83	184.85
Aircraft			0.25	36.53
Automobiles	0.01	3.86	3.45	878.89
Coating (general)	0.00	1.03	2.54	650.80
Fabric			0.06	9.64
Flatwood Products			0.48	114.98
Large Appliances			0.02	4.27
Magnet Wire			0.01	1.14

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Metal Cans	0.02	6.58	1.87	641.58
Metal Coils	0.00	0.24	0.52	128.44
Metal Furniture			0.13	33.08
Miscellaneous Metal Parts	0.00	0.24	4.52	1,254.37
Ovens	0.75	248.76	0.13	37.42
Paper	0.01	1.60	1.54	480.86
Plastic Parts	0.00	0.00	1.60	442.65
Steel Drums			0.89	233.24
Thinning Solvents	0.00	1.60	0.13	40.29
Wood Furniture			1.80	440.77
Other	0.00	1.36	1.78	350.84
Fuel Combustion	0.29	86.57	0.02	5.71
Fugitives			0.17	46.08
Petroleum Product Storage				
Fixed Roof Tanks	0.00	0.00	3.05	886.71
Floating Roof Tanks			4.21	1,395.15
Variable Vapor Space Tanks			0.16	51.48
Fugitives			0.39	80.33
Bulk Terminals/Plants				
Fixed Roof Tanks	0.00	0.00	0.57	205.26
Floating Roof Tanks	0.00	0.00	1.53	530.25
Losses	0.00	1.40	0.56	212.70
Variable Vapor Space Tanks			0.02	5.83
Printing/Publishing				
Digital			0.10	17.20
Flexographic			1.90	589.45
Letterpress			0.11	38.93
Lithographic			4.16	1,227.73
Rotogravure			1.45	508.68
Screen Printing			0.30	73.25
Fuel Combustion	0.00	0.16	0.00	0.00

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Petroleum Marketing/Transport				
Pipelines			0.01	1.75
Stage I			0.02	6.39
Stage II	0.00	1.71	0.10	30.99
Tank Cars	0.01	5.42	0.51	150.21
Transportation	0.01	4.91	1.10	94.65
Fugitives	0.00	0.05	0.23	82.63
Organic Chemical Storage				
Fixed Roof Tanks			1.24	413.98
Floating Roof Tanks			0.25	67.10
Pressure Tanks			0.04	10.04
Organic Chemical Transport			0.28	57.59
Organic Solvent Evaporation				
Evaporation	0.00	0.08	0.19	65.97
Other	0.00	1.10	0.87	262.98
Fuel Combustion	0.10	7.55	0.01	1.70
Solid Waste Disposal				
Government				
Incineration	0.00	0.00	0.00	0.00
Landfills	1.38	477.59	0.97	328.24
Sewage Treatment	0.04	9.93	0.17	48.70
Commercial/Institutional				
Other	0.00	0.17	0.00	0.06
Fuel Combustion	0.00	0.00	0.00	0.00
Industrial				
Incineration	0.15	63.76	0.01	3.33
Landfills	0.38	128.95	0.04	13.88
TSDFs			0.01	1.56

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other			0.05	17.11
Fuel Combustion	0.05	16.26	0.00	0.75
Site Remediation				
Air Stripping			0.06	17.62
Soil Venting	0.00	0.46	0.06	14.81
Other	0.00	0.73	0.27	92.68
Commercial Incineration	0.08	13.02	0.01	0.85
<b>Point Source Total</b>	<b>314.28</b>	<b>11,892.71</b>	<b>136.85</b>	<b>12,031.35</b>
<b>Area Sources</b>				
Agricultural Field Burning	0.00	7.67	0.00	28.47
Agricultural Pesticide Application			94.39	22,619.41
Aircraft Refueling			4.19	1,258.14
Architectural Coating			53.55	14,978.37
Asphalt Paving				
Cutback			0.00	89.98
Emulsion			0.91	141.51
Automobile Refinishing			2.82	733.65
Commercial Cooking			1.27	462.95
Consumer Solvent Use			148.39	53,960.53
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.02	5.71
Forest Fires	0.02	139.53	0.41	2,406.41
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.20	490.02	0.00	8.35
Kerosene	0.00	2.33	0.00	0.04
LPG	0.00	0.13	0.00	0.01
Natural Gas	8.13	9,212.15	0.45	513.29
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	1.01	485.23	0.01	4.73
Kerosene	0.00	1.00	0.00	0.01
LPG	0.01	2.78	0.00	0.15
Natural Gas	12.75	7,563.80	0.53	343.47
Residual Oil	0.15	65.78	0.00	0.39
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.02	27.85	0.00	1.08
Kerosene	0.00	6.31	0.00	0.24
LPG	0.79	1310.79	0.03	50.87
Natural Gas	13.24	17,765.67	0.77	1,039.48
Wood				
Firelog	0.00	86.77	0.00	446.72
Fireplaces	0.00	159.26	0.00	1,812.94
Furnace	0.00	74.67	0.00	485.38
Hydronic Heater	0.00	65.58	0.00	2,455.76
Outdoor	0.00	23.53	0.00	171.01
Wood Stoves	0.00	126.07	0.00	1,407.88
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			5.74	1,952.58
Stage II				
Diesel			1.44	448.75
Gasoline			12.63	3,522.16
Storage Tank Breathing			7.35	2,496.96
Tank Truck Leaks			0.42	147.45
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			16.46	4,275.57

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Incineration	4.46	1,622.97	2.98	1,084.84
Industrial Surface Coating				
Maintenance			14.86	3,860.59
Other Special Purpose			1.58	409.66
Marine Vessel Loading and Transport			3.53	1,105.54
Oil and Gas Production	23.36	8,495.21	67.15	24,419.51
Oil Exploration			8.30	3,017.77
Open Burning				
Land Clearing	0.76	138.68	1.77	321.73
Prescribed Burning	0.72	2,849.14	10.51	44,490.23
Residential Household Waste	2.06	748.92	2.94	1,068.46
Yard Waste				
Brush	0.00	14.41	0.00	54.75
Leaves	0.00	17.87	0.00	80.69
Pavement Marking			0.14	21.32
Portable Fuel Containers				
Commercial			4.90	1,224.04
Residential			21.73	5,433.62
Residential Grilling	8.15	132.49	8.38	184.28
Solvent Cleaning			32.96	10,367.00
Structure Fires	0.15	13.59	1.16	106.78
Waste Water Treatment – POTWs			0.78	282.31
<b>Area Source Totals</b>	<b>75.98</b>	<b>51,650.51</b>	<b>535.45</b>	<b>215,803.51</b>
<b>On-road Mobile Sources</b>				
Bus				
Intercity	2.25	770.71	0.13	40.91
School	6.57	2,247.89	0.91	297.86
Transit	2.71	922.37	0.20	65.10
Car	57.22	20,399.31	62.11	22,691.43
Motor Home	1.60	559.43	0.74	227.11
Motorcycle	2.42	592.86	6.52	1,709.40

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Truck				
Combination Long Haul	121.99	42,258.78	11.19	3,628.52
Combination Short Haul	24.41	8,383.28	1.20	405.13
Light Commercial	19.65	6,676.13	13.13	4,624.20
Passenger	67.34	23,111.92	48.76	17,102.80
Refuse	2.80	963.76	0.16	52.44
Single Unit Long Haul	1.72	586.99	0.32	104.52
Single Unit Short Haul	29.88	10,118.37	6.81	2,136.55
<b>On-road Mobile Source Totals</b>	<b>340.57</b>	<b>117,591.80</b>	<b>152.19</b>	<b>53,085.96</b>
<b>Off-road Mobile Sources</b>				
Agricultural Equipment				
2-stroke	0.01	1.02	0.12	19.83
4-stroke	1.37	240.01	2.53	417.70
CNG	0.00	0.15	0.00	0.13
Diesel	147.26	23,169.14	13.86	2,181.11
LPG	0.00	0.51	0.00	0.11
Aircraft				
Air Taxi	0.98	467.67	0.46	218.50
APUs	0.38	176.58	0.03	15.59
Commercial	11.85	5,435.37	1.74	798.86
General Aviation	0.22	84.34	0.52	199.62
Military	0.01	2.31	0.06	20.78
Airport Service Equipment				
4-stroke	0.01	2.69	0.01	2.65
Diesel	0.87	321.28	0.09	31.29
LPG	0.01	2.29	0.00	0.32
Commercial Equipment				
2-stroke	0.07	22.02	1.87	587.49
4-stroke	3.33	1280.28	10.97	3374.45
CNG	0.40	127.05	0.22	70.42
Diesel	9.38	2,956.01	1.11	351.11
LPG	1.15	363.03	0.19	58.98
Commercial Marine Vessels	80.27	16,454.98	2.31	472.90

Table A-1: Statewide Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Construction and Mining Equipment				
CNG	0.00	0.11	0.00	0.09
LPG	0.09	24.14	0.02	4.58
Construction Equipment				
2-stroke	0.05	12.78	1.84	489.28
4-stroke	0.31	98.93	0.75	202.14
Diesel	49.19	13,115.55	6.19	1,650.14
Industrial Equipment				
2-stroke	0.00	0.05	0.00	1.12
4-stroke	0.20	62.14	0.24	63.28
CNG	0.47	124.42	0.25	65.28
Diesel	10.88	3,052.69	1.09	299.28
LPG	6.67	1,750.14	0.99	259.55
Lawn and Garden Equipment				
2-stroke	0.86	202.26	25.26	7,383.77
4-stroke	8.52	1,901.87	33.92	7,007.99
Diesel	5.84	969.53	0.57	94.42
LPG	0.05	8.77	0.01	1.22
Locomotives				
Class I	71.70	26,171.46	3.31	1,206.72
Class II/III	3.57	1,302.40	0.17	60.25
Commuter	17.12	4,451.08	0.87	227.11
Passenger	3.39	1,235.65	0.19	68.92
Yard	11.97	4,368.18	0.78	286.08
Logging Equipment				
2-stroke	0.00	0.87	0.12	38.92
4-stroke	0.01	2.53	0.03	7.47
Diesel	0.07	21.01	0.01	3.28
Railroad Equipment				
4-stroke	0.00	1.63	0.01	4.03
Diesel	0.41	120.47	0.07	20.20
LPG	0.00	0.11	0.00	0.02

Table A-1: Statewide Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Recreational Marine Vessels				
2-stroke	4.73	1,473.01	27.82	7,728.06
4-stroke	3.09	1,019.71	4.01	970.96
Diesel	3.59	1,117.36	0.20	61.52
Recreational Vehicles				
2-stroke	0.40	635.72	24.35	13,917.89
4-stroke	1.16	338.41	8.58	2,144.52
Diesel	0.23	58.59	0.05	13.29
LPG	0.01	3.84	0.00	0.84
Underground Mining Equipment				
Diesel	1.01	225.93	0.19	43.04
<b>Off-road Mobile Source Totals</b>	<b>463.18</b>	<b>114,978.09</b>	<b>177.99</b>	<b>53,147.11</b>
<b>Totals</b>				
<b>Point Source</b>	<b>314.28</b>	<b>65,502.07</b>	<b>136.85</b>	<b>38,762.31</b>
<b>Area Source</b>	<b>75.98</b>	<b>51,650.51</b>	<b>535.45</b>	<b>215,803.51</b>
<b>On-road Mobile</b>	<b>340.57</b>	<b>117,591.80</b>	<b>152.19</b>	<b>53,085.96</b>
<b>Off-road Mobile</b>	<b>463.18</b>	<b>114,978.09</b>	<b>177.99</b>	<b>53,147.11</b>
<b>Total</b>	<b>1,194.01</b>	<b>137,368.71</b>	<b>1,002.47</b>	<b>360,798.89</b>

Appendix B

2017  
Chicago NAA Emissions by Category

Table B-1: Chicago NAA Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Point Sources</b>				
External Fuel Combustion				
Electric Generation				
Coal	6.15	1,301.77	0.00	1.67
Distillate Oil	0.00	0.01	0.00	0.00
Natural Gas	5.83	164.88	0.05	3.04
Industrial				
Coal	1.12	394.43	0.01	2.70
Distillate Oil	0.06	10.06	0.00	0.12
Natural Gas	5.31	1,599.43	0.33	102.50
Process Gas	1.06	368.12	0.04	13.82
Residual Oil	0.00	0.00	0.00	0.00
Other	0.07	21.71	0.00	0.19
Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.26	4.28	0.00	0.07
Natural Gas	3.28	1,057.25	0.18	56.70
Process Gas	0.07	28.16	0.00	1.54
Residual Oil	0.00	0.00	0.00	0.00
Space Heating				
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.07	35.86	0.00	1.97
Other	0.00	0.06	0.00	0.00
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	4.04	120.03	0.08	1.46
Landfill Gas	1.12	346.64	0.14	52.91
Natural Gas	13.69	706.51	0.57	33.13

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	0.16	10.20	0.00	0.36
Distillate Oil	7.34	207.36	0.42	14.21
Natural Gas	2.69	586.17	0.19	35.14
Other	0.15	0.15	0.00	0.00
Commercial/Institutional				
Distillate Oil	6.63	202.57	0.38	10.31
Natural Gas	1.24	78.57	0.15	8.80
Other	0.00	0.00	0.00	0.00
Engine Testing				
Diesel	0.56	85.57	0.04	8.05
Distillate Oil	0.59	123.10	0.02	3.79
Other	0.01	2.07	0.04	9.45
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.12	32.23
Ammonia			0.00	0.00
Fixed Roof Tanks			0.01	4.01
Ink			0.28	71.24
Paint	0.00	0.02	0.95	260.55
Pharmaceuticals	0.00	0.02	0.28	41.64
Phthalic Anhydride	0.20	78.11	0.63	172.33
Plastics	0.09	23.27	0.36	104.90
Polyethylene	0.01	3.25	0.54	178.53
Pressure Tanks			0.00	0.55
Resins			0.03	10.82
Sulfuric Acid	0.00	0.25	0.00	0.00
Synthetic Organic Fiber			0.00	0.00
Synthetic Rubber			0.03	5.84
Varnish			0.02	4.60
Other	1.47	445.89	2.69	686.90
Fuel Combustion	1.79	584.06	0.15	54.47
Fugitives	0.00	0.00	0.39	153.83

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Food/Agriculture				
Bakeries	0.06	18.22	2.26	717.52
Candy			0.37	94.34
Coffee	0.00	0.03	0.00	0.03
Distilled Spirits			0.01	3.01
Milling	0.04	9.63	0.78	137.45
Smokehouses	0.01	1.73	0.08	24.21
Starch Manufacturing	0.04	15.28	0.48	117.13
Vegetable Oil	0.02	6.30	0.05	14.24
Other	0.08	25.96	1.72	327.79
Fuel Combustion	0.31	96.86	0.02	7.05
Fugitives	0.00	0.00	0.66	238.62
Primary Metal Production				
Steel	0.22	63.07	0.09	23.66
Other	0.00	0.00	0.02	4.90
Fuel Combustion	0.21	72.98	0.01	4.33
Secondary Metal Production				
Aluminum	0.04	13.55	0.20	66.49
Copper	0.00	0.67	0.03	6.52
Gray Iron	0.00	0.00	0.01	5.92
Heat Treating	0.02	4.19	0.07	18.81
Lead	0.00	0.48	0.00	0.42
Lead Battery			0.00	0.10
Steel	0.02	6.68	0.01	3.41
Zinc	0.16	45.08	0.05	12.31
Other	0.06	17.83	0.09	20.55
Fuel Combustion	0.60	178.66	0.05	14.75

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Mineral Products				
Asphalt Manufacturing	1.15	149.66	1.21	163.01
Asphalt Roofing	0.02	8.85	0.11	37.04
Bulk Materials			0.00	0.00
Calcining	0.00	0.00	0.00	0.44
Concrete Manufacturing			0.01	3.11
Glass Manufacturing	0.48	184.29	0.08	27.65
Sand/Gravel	0.02	4.62	0.00	0.25
Other	0.04	4.58	0.30	28.25
Fuel Combustion	0.43	106.35	0.02	5.05
Fugitives	0.02	4.51	0.02	5.67
Petroleum Industry				
Cooling Towers			0.02	5.67
FCCU	0.62	221.77	0.01	1.97
Flares	0.05	5.01	0.02	2.57
Process Heaters	3.27	1,086.25	0.09	28.43
Waste Water	0.00	0.78	0.06	171.71
Other	0.05	22.75	0.17	57.71
Fugitives	0.02	18.13	0.55	192.05
Paper and Wood Products				
Plywood			0.00	0.03
Pulpboard			0.02	5.05
Woodworking			0.01	1.49
Other	0.00	0.01	0.12	19.70
Fugitives			0.00	0.50

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Rubber and Plastic Products				
Plastic Foam			1.58	598.41
Plastic Products	0.00	0.42	0.49	125.89
Tire Manufacturing			0.03	6.53
Other	0.00	0.30	0.22	74.40
Fuel Combustion	0.15	18.44	0.01	0.96
Fabricated Metal Products				
Drum Reclamation	0.00	0.72	0.01	2.85
Plating	0.04	9.81	0.04	8.87
Welding	0.00	0.31	0.01	1.73
Other	0.05	12.72	1.47	371.05
Fuel Combustion	0.18	69.40	0.08	26.41
Fugitives	0.02	3.33	0.03	8.69
Oil and Gas Production				
Crude Oil			0.03	8.69
Natural Gas	0.05	10.67	0.01	2.43
Fuel Combustion	0.02	2.92	0.01	0.72
Fugitives			0.04	15.38
Miscellaneous Machinery	0.00	0.76	0.06	8.23
Electrical Equipment	0.00	1.62	0.12	36.14
Transportation Equipment			0.01	4.02
Health Services				
Sterilizers			0.02	5.67
Other			0.00	0.19
Photographic Film			0.01	0.59
Leather and Leather Products			0.08	15.72
Textile Products			0.00	0.36
Process Cooling			0.09	33.95

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
In-Process Fuel Use				
Coal	0.01	0.11	0.00	0.04
Other	0.20	76.47	0.00	0.07
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.00	0.18	0.25	64.02
Fuel Combustion	0.04	14.04	0.01	2.71
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.25	73.21
Degreasing			0.59	141.80
Dry Cleaning			0.64	179.83
Fugitives			0.01	3.16
Surface Coating Operations				
Adhesives	0.00	0.00	0.44	102.36
Aircraft			0.00	0.90
Automobiles	0.00	0.00	1.59	475.05
Coating (general)	0.00	0.53	0.36	75.71
Fabric			0.02	1.76
Flatwood Products			0.05	13.23
Metal Cans	0.01	1.50	0.26	145.93
Metal Coils	0.00	0.00	0.15	49.39
Metal Furniture			0.13	32.41
Miscellaneous Metal Parts	0.00	0.00	1.69	492.20
Ovens	0.36	136.83	0.08	21.85
Paper			0.67	213.50

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Plastic Parts			0.03	12.09
Steel Drums			0.80	202.70
Thinning Solvents	0.00	1.60	0.02	3.12
Wood Furniture			0.44	107.29
Other	0.00	1.21	1.53	293.65
Fuel Combustion	0.15	51.32	0.01	2.91
Fugitives			0.15	39.13
Petroleum Product Storage				
Fixed Roof Tanks	0.00	0.00	0.67	201.09
Floating Roof Tanks			1.14	422.55
Variable Vapor Space Tanks			0.09	25.64
Fugitives			0.25	29.34
Bulk Terminals/Plants				
Fixed Roof Tanks	0.00	0.00	0.10	32.81
Floating Roof Tanks	0.00	0.00	0.52	178.08
Losses	0.00	0.11	0.19	77.08
Variable Vapor Space Tanks			0.01	4.31
Printing/Publishing				
Digital			0.09	17.01
Flexographic			1.50	415.00
Letterpress			0.06	17.34
Lithographic			2.24	649.83
Rotogravure			0.63	151.02
Screen Printing			0.17	43.58
Fuel Combustion	0.00	0.16	0.00	0.00

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Petroleum Marketing/Transport				
Stage I			0.00	0.45
Stage II			0.06	18.94
Tank Cars	0.01	1.91	0.23	76.42
Transportation	0.00	0.00	1.00	61.81
Fugitives			0.09	31.37
Organic Chemical Storage				
Fixed Roof Tanks			0.46	133.39
Floating Roof Tanks			0.09	34.33
Pressure Tanks			0.03	7.81
Organic Chemical Transport			0.05	3.28
Organic Solvent Evaporation				
Evaporation	0.00	0.08	0.02	5.75
Other	0.00	1.10	0.64	199.72
Fuel Combustion	0.10	6.74	0.01	0.11
Solid Waste Disposal				
Government				
Landfills	0.51	172.31	0.09	30.48
Sewage Treatment	0.02	4.05	0.12	34.83
Commercial/Institutional				
Other	0.00	0.17	0.00	0.06
Fuel Combustion	0.00	0.00	0.00	0.00
Industrial				
Incineration	0.02	5.09	0.01	2.84
Landfills	0.09	30.13	0.01	3.15
Other			0.04	13.82
Fuel Combustion	0.05	16.26	0.00	0.75

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Site Remediation				
Air Stripping			0.01	4.15
Soil Venting	0.00	0.00	0.03	9.57
Other	0.00	0.70	0.00	0.47
Commercial incineration	0.00	0.31	0.00	0.43
<b>Point Source Total</b>	<b>75.19</b>	<b>11,631.09</b>	<b>44.32</b>	<b>11,805.24</b>
<b>Area Sources</b>				
Agricultural Field Burning	0.00	0.22	0.00	0.90
Agricultural Pesticide Application			1.68	402.95
Aircraft Refueling			0.92	274.90
Architectural Coating			34.06	9,527.34
Asphalt Paving				
Cutback			0.00	16.30
Emulsion			0.16	25.64
Automobile Refinishing			1.29	334.66
Commercial Cooking			0.81	294.47
Consumer Solvent Use			94.39	34,322.86
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.00	0.17
Forest Fires	0.01	3.01	0.14	56.77
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.12	360.72	0.00	6.14
Kerosene	0.00	1.70	0.00	0.03
LPG	0.00	0.09	0.00	0.01
Natural Gas	5.94	6,809.60	0.32	375.98
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.62	293.59	0.01	2.87
Kerosene	0.00	0.60	0.00	0.01
LPG	0.00	1.72	0.00	0.09
Natural Gas	8.76	5,216.21	0.31	220.25
Residual Oil	0.09	40.63	0.00	0.24
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	10.82	0.00	0.42
Kerosene	0.00	2.45	0.00	0.10
LPG	0.10	169.52	0.00	6.58
Natural Gas	8.82	11,838.19	0.52	692.66
Wood				
Firelog	0.00	57.40	0.00	295.54
Fireplaces	0.00	68.58	0.00	676.91
Furnace	0.00	0.22	0.00	1.42
Hydronic Heater	0.0	00.18	0.00	6.82
Outdoor	0.00	10.93	0.00	79.42
Wood Stoves	0.00	24.12	0.00	214.16
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			2.83	962.18
Stage II				
Diesel			0.73	228.90
Gasoline			5.39	1,586.55
Storage Tank Breathing			3.92	1,331.29
Tank Truck Leaks			0.22	78.61
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			12.61	3,274.99

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Incineration	2.89	1,053.51	1.89	689.32
Industrial Surface Coating				
Maintenance			9.45	2,455.62
Other Special Purpose			1.00	260.58
Marine Vessel Loading and Transport			0.85	266.09
Oil and Gas Production	0.00	0.00	0.00	0.00
Oil Exploration			0.00	0.00
Open Burning				
Land Clearing	0.00	0.38	0.00	0.88
Prescribed Burning	0.00	399.54	0.00	6,754.72
Residential Household Waste	0.10	35.29	0.14	50.35
Yard Waste				
Brush	0.00	0.05	0.00	0.21
Leaves	0.00	0.07	0.00	0.31
Pavement Marking			0.03	3.86
Portable Fuel Containers				
Commercial			3.37	841.45
Residential			14.94	3,735.28
Residential Grilling	4.72	76.63	4.85	106.58
Solvent Cleaning			19.73	6,193.76
Structure Fires	0.09	8.34	0.71	65.53
Waste Water Treatment – POTWs			0.52	189.85
<b>Area Source Totals</b>	<b>32.29</b>	<b>26,484.32</b>	<b>217.80</b>	<b>76,913.53</b>
<b>On-road Mobile Sources</b>				
Bus				
Intercity	1.18	404.26	0.07	21.40
School	3.45	1,179.97	0.48	157.89
Transit	1.42	483.91	0.11	34.20
Car	29.60	10,824.13	34.02	12,906.44
Motor Home	0.84	295.83	0.40	124.08
Motorcycle	1.27	314.10	3.44	923.55

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Truck				
Combination Long Haul	62.31	21,582.78	5.69	1,846.78
Combination Short Haul	12.49	4,291.12	0.61	209.71
Light Commercial	9.11	3,158.14	6.22	2,298.73
Passenger	30.42	10,684.96	22.78	8,402.23
Refuse	1.43	492.94	0.08	27.18
Single Unit Long Haul	0.90	306.69	0.17	55.99
Single Unit Short Haul	15.65	5,303.02	3.67	1,162.20
<b>On-road Mobile Source Totals</b>	<b>170.08</b>	<b>59,321.86</b>	<b>77.73</b>	<b>28,170.39</b>
<b>Off-road Mobile Sources</b>				
Agricultural Equipment				
2-stroke	0.00	0.02	0.00	0.44
4-stroke	0.03	5.68	0.05	8.41
CNG	0.00	0.00	0.00	0.00
Diesel	3.39	532.79	0.32	50.16
LPG	0.00	0.01	0.00	0.00
Aircraft				
Air Taxi	0.84	402.26	0.37	176.80
APUs	0.36	167.54	0.03	14.65
Commercial	11.06	5,066.79	1.47	673.09
General Aviation	0.07	27.67	0.18	72.87
Military	0.00	0.14	0.00	1.22
Airport Service Equipment				
4-stroke	0.01	2.59	0.01	2.53
Diesel	0.84	308.60	0.08	30.06
LPG	0.01	2.20	0.00	0.30
Commercial Equipment				
2-stroke	0.05	15.73	1.34	419.05
4-stroke	2.39	921.90	7.57	2,360.57
CNG	0.29	90.78	0.16	50.32
Diesel	6.71	2,112.20	0.80	250.88
LPG	0.82	259.40	0.13	42.14
Commercial Marine Vessels	11.11	2,277.25	0.31	64.50

Table B-1: Chicago NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Construction and Mining Equipment				
CNG	0.00	0.08	0.00	0.06
LPG	0.06	16.12	0.01	3.06
Construction Equipment				
2-stroke	0.03	8.54	1.22	326.01
4-stroke	0.21	66.61	0.48	130.52
Diesel	32.84	8,757.73	4.13	1,101.86
Industrial Equipment				
2-stroke	0.00	0.03	0.00	0.69
4-stroke	0.11	36.07	0.11	30.95
CNG	0.29	74.92	0.15	39.43
Diesel	6.71	1,886.48	0.67	184.35
LPG	4.11	1,077.39	0.61	159.78
Lawn and Garden Equipment				
2-stroke	0.62	143.39	18.14	5,244.59
4-stroke	6.02	1,322.97	22.76	4,655.06
Diesel	4.38	727.18	0.43	70.82
LPG	0.04	6.58	0.01	0.92
Locomotives				
Class I	15.49	5,654.29	0.71	260.71
Class II/III	0.83	303.66	0.04	14.05
Commuter	15.81	4,111.71	0.81	209.79
Passenger	0.97	352.61	0.05	19.67
Yard	6.56	2,395.25	0.43	156.87
Logging Equipment				
2-stroke	0.00	0.06	0.01	2.84
4-stroke	0.00	0.19	0.00	0.51
Diesel	0.00	1.54	0.00	0.24
Railroad Equipment				
4-stroke	0.00	0.46	0.00	0.99
Diesel	0.11	32.96	0.02	5.53
LPG	0.00	0.03	0.00	0.01

Table B-1: Chicago NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Recreational Marine Vessels				
2-stroke	0.45	139.77	2.40	683.29
4-stroke	0.64	212.65	0.64	160.22
Diesel	0.73	226.50	0.04	12.43
Recreational Vehicles				
2-stroke	0.13	48.97	7.27	2,100.52
4-stroke	0.39	113.15	2.59	660.80
Diesel	0.07	18.76	0.02	4.26
LPG	0.00	1.23	0.00	0.27
Underground Mining Equipment				
Diesel	0.00	0.00	0.00	0.00
<b>Off-road Mobile Source Totals</b>	<b>135.59</b>	<b>39,931.44</b>	<b>76.59</b>	<b>20,459.08</b>
<b>Totals</b>				
<b>Point Source</b>	<b>75.19</b>	<b>11,631.09</b>	<b>44.32</b>	<b>11,805.24</b>
<b>Area Source</b>	<b>32.29</b>	<b>26,484.32</b>	<b>217.80</b>	<b>76,913.53</b>
<b>On-road Mobile</b>	<b>170.08</b>	<b>59,321.86</b>	<b>77.73</b>	<b>28,170.39</b>
<b>Off-road Mobile</b>	<b>135.59</b>	<b>39,931.44</b>	<b>76.59</b>	<b>20,459.08</b>
<b>Total</b>	<b>413.14</b>	<b>137,368.71</b>	<b>416.45</b>	<b>137,348.25</b>

# Appendix C

2017  
Metro-East NAA Emissions by Category

Table C-1: Metro-East NAA Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Point Sources</b>				
External Fuel Combustion				
Electric Generation				
Coal	0.00	1.54	0.00	0.02
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00
Industrial				
Distillate Oil	0.02	3.87	0.00	0.09
Natural Gas	0.52	186.76	0.03	12.28
Process Gas	1.24	450.90	0.05	19.80
Residual Oil	0.01	5.36	0.00	0.11
Other	0.00	0.00	0.00	0.00
Commercial/Institutional				
Distillate Oil	0.02	1.09	0.00	0.02
Natural Gas	0.05	23.33	0.00	1.28
Residual Oil	0.00	0.00	0.00	0.00
Space Heating				
Natural Gas	0.01	13.53	0.00	0.75
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	1.20	6.41	0.03	0.18
Natural Gas	0.77	16.12	0.04	0.87
Industrial				
Diesel	0.03	0.22	0.00	0.01
Distillate Oil	0.08	20.57	0.01	4.08
Natural Gas	0.25	14.93	0.00	0.13
Other	0.00	0.00	0.00	0.00

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Commercial/Institutional				
Distillate Oil	0.15	11.77	0.01	0.79
Natural Gas	0.00	0.00	0.00	0.00
Engine Testing				
Other	0.00	0.00	0.00	0.00
Industrial Processes				
Chemical Manufacturing				
Ink			0.00	0.02
Paint			0.03	6.04
Plastics			0.03	10.95
Synthetic Rubber			0.00	0.10
Other	0.05	16.99	0.16	48.11
Fuel Combustion	0.03	11.26	0.01	2.54
Fugitives			0.21	76.22
Food/Agriculture				
Bakeries			0.07	17.39
Beer			0.00	0.17
Biodiesel			0.01	3.72
Ethanol	0.10	22.95	0.16	51.57
Milling	0.05	18.56	0.03	9.41
Vegetable Oil			0.00	0.00
Other	0.00	0.10	0.09	30.74
Fuel Combustion	0.01	0.79	0.00	0.05
Fugitives			0.04	12.00
Primary Metal Production				
By-product Coke	1.02	382.80	0.01	3.63
Ferroalloy			0.00	0.00
Steel	0.22	49.91	0.04	8.38
Other	0.00	0.50		
Fuel Combustion	0.20	61.61	0.01	4.11
Fugitives			0.00	0.00

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Secondary Metal Production				
Copper	0.00	0.00	0.00	0.05
Gray Iron	0.00	0.87	0.00	0.56
Lead	0.00	0.00		
Steel	0.04	8.88	0.06	13.65
Other	0.00	0.01	0.13	30.96
Fuel Combustion	0.25	67.12	0.01	3.10
Mineral Products				
Asphalt Manufacturing	0.26	19.26	0.21	18.59
Asphalt Roofing			0.00	0.11
Brick Manufacturing	0.00	1.98		
Concrete Manufacturing	0.01	0.35		
Other			0.00	0.03
Fuel Combustion	0.00	0.00	0.00	0.00
Fugitives			0.03	12.26
Petroleum Industry				
Cooling Towers			0.06	20.45
Desulfurization	0.04	17.81	0.00	0.25
FCCU	0.27	97.28	0.00	0.57
Flares	0.10	36.78	0.93	338.39
Process Heaters	3.91	1,313.32	0.20	69.06
Waste Water	0.00	0.00	0.35	125.90
Other	0.00	0.00	0.04	9.43
Fugitives	0.01	1.69	1.53	562.36
Rubber and Plastic Products				
Plastic Products			0.09	23.83
Fabricated Metal Products				
Welding	0.00	0.00	0.00	0.00
Other	0.04	10.35	0.04	7.19
Fuel Combustion	0.02	6.66	0.00	0.36

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Oil and Gas Production				
Natural Gas	0.00	0.05	0.00	0.14
Health Services				
Crematories	0.00	0.86		
Sterilizers			0.00	0.51
Textile Products			0.01	1.95
Process Cooling			0.01	2.35
In-Process Fuel Use				
Process Gas	0.00	0.00	0.00	0.00
Other			0.00	0.04
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.00	0.31	0.01	3.61
Fuel Combustion	0.00	0.04	0.00	0.02
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.09	10.91
Degreasing			0.07	20.19
Dry Cleaning			0.02	6.98
Fugitives			0.00	1.51
Surface Coating Operations				
Adhesives			0.02	2.99
Aircraft			0.22	25.54
Automobiles			0.01	3.28
Coating (general)			0.09	39.83
Flatwood Products			0.02	5.34
Metal Coils	0.00	0.24	0.28	57.52
Metal Furniture			0.00	0.01
Miscellaneous Metal Parts	0.00	0.08	0.17	41.51
Ovens	0.01	1.72	0.00	0.10
Paper			0.13	14.20
Thinning Solvents			0.00	1.02

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Wood Furniture			0.03	0.10
Other			0.01	1.78
Fuel Combustion	0.05	11.84	0.00	0.62
Petroleum Product Storage				
Fixed Roof Tanks			1.16	352.65
Floating Roof Tanks			1.04	378.72
Variable Vapor Space Tanks			0.00	0.50
Fugitives			0.00	0.52
Bulk Terminals/Plants				
Fixed Roof Tanks			0.14	48.52
Floating Roof Tanks			0.48	139.71
Losses	0.00	0.03	0.10	37.36
Printing/Publishing				
Flexographic			0.05	15.70
Lithographic			0.01	4.29
Rotogravure			0.00	0.86
Petroleum Marketing/Transport				
Stage I			0.01	2.70
Stage II	0.00	1.71	0.00	1.11
Tank Cars	0.01	3.52	0.11	37.40
Transportation	0.01	4.91	0.09	32.84
Fugitives			0.02	6.71
Organic Chemical Storage				
Fixed Roof Tanks			0.03	10.71
Floating Roof Tanks			0.03	10.29
Organic Solvent Evaporation				
Evaporation			0.01	3.00
Other			0.01	3.89

Table C-1: Metro-East NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Solid Waste Disposal				
Government				
Landfills	0.23	82.01	0.18	63.86
Sewage Treatment	0.00	0.00	0.00	0.87
Industrial				
Incineration	0.12	56.59	0.00	0.21
Landfills	0.14	51.02	0.01	3.97
TSDFs			0.00	0.39
Other			0.00	0.25
Site Remediation				
Air Stripping			0.00	1.04
Soil Venting	0.00	0.46	0.02	4.45
Other	0.00	0.03	0.25	89.81
<b>Point Source Total</b>	<b>11.57</b>	<b>3,119.65</b>	<b>9.72</b>	<b>3,057.04</b>
<b>Area Sources</b>				
Agricultural Field Burning	0.00	0.00	0.00	0.00
Agricultural Pesticide Application			1.87	447.43
Aircraft Refueling			0.23	69.13
Architectural Coating			2.21	617.65
Asphalt Paving				
Cutback			0.00	3.27
Emulsion			0.03	5.15
Automobile Refinishing			0.10	25.59
Commercial Cooking			0.05	19.09
Consumer Solvent Use			6.12	2,225.13
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.00	0.82
Forest Fires	0.00	0.04	0.00	0.71

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	15.36	0.00	0.26
Kerosene	0.00	0.08	0.00	0.00
LPG	0.00	0.00	0.00	0.00
Natural Gas	0.37	331.34	0.02	18.23
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	9.21	0.00	0.05
Kerosene	0.00	0.03	0.00	0.00
LPG	0.00	0.08	0.00	0.00
Natural Gas	0.00	15.76	0.00	0.00
Residual Oil	0.00	0.21	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.00	1.65	0.00	0.06
Kerosene	0.00	0.37	0.00	0.01
LPG	0.05	75.06	0.00	2.91
Natural Gas	0.49	661.09	0.03	38.68
Wood				
Firelog	0.00	1.87	0.00	9.61
Fireplaces	0.00	9.63	0.00	117.61
Furnace	0.00	0.00	0.00	0.00
Hydronic Heater	0.00	0.00	0.00	0.00
Outdoor	0.00	1.57	0.00	11.44
Wood Stoves	0.00	7.99	0.00	84.43

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			0.30	103.13
Stage II				
Diesel			0.09	27.52
Gasoline			0.67	195.87
Storage Tank Breathing			0.40	134.32
Tank Truck Leaks			0.02	7.93
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			0.35	89.65
Incineration	0.09	34.51	0.12	44.66
Industrial Surface Coating				
Maintenance			0.61	159.20
Other Special Purpose			0.07	16.89
Marine Vessel Loading and Transport			0.58	182.25
Oil and Gas Production	0.21	74.84	0.62	224.88
Oil Exploration	0.02	7.11	0.00	0.00
Open Burning				
Land Clearing	0.00	0.00	0.00	0.00
Prescribed Burning	0.00	43.76	0.00	771.12
Residential Household Waste	0.09	31.79	0.12	45.36
Yard Waste				
Brush	0.00	0.00	0.00	0.00
Leaves	0.00	0.00	0.00	0.00
Pavement Marking			0.01	0.78
Portable Fuel Containers				
Commercial			0.15	37.12
Residential			0.66	164.79

Table C-1: Metro-East NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Residential Grilling	0.40	6.43	0.41	8.94
Solvent Cleaning			1.09	359.83
Structure Fires	0.01	0.66	0.06	5.22
Waste Water Treatment – POTWs			0.03	9.43
<b>Area Source Totals</b>	<b>1.71</b>	<b>1,323.31</b>	<b>17.03</b>	<b>6,293.30</b>
<b>On-road Mobile Sources</b>				
Bus				
Intercity	0.12	42.86	0.01	2.31
School	0.36	124.65	0.05	16.32
Transit	0.15	51.26	0.01	3.64
Car	2.74	954.99	2.90	975.84
Motor Home	0.09	30.29	0.04	11.85
Motorcycle	0.13	30.86	0.34	89.24
Truck				
Combination Long Haul	7.38	2,575.06	0.69	224.31
Combination Short Haul	1.47	506.87	0.07	24.22
Light Commercial	1.04	346.38	0.67	221.72
Passenger	3.53	1,194.94	2.50	819.37
Refuse	0.17	58.41	0.01	3.13
Single Unit Long Haul	0.10	33.27	0.02	5.70
Single Unit Short Haul	1.67	570.26	0.37	114.30
<b>On-road Mobile Source Totals</b>	<b>18.94</b>	<b>6,520.09</b>	<b>7.69</b>	<b>2,511.94</b>
<b>Off-road Mobile Sources</b>				
Agricultural Equipment				
2-stroke	0.00	0.02	0.00	0.43
4-stroke	0.03	5.04	0.05	8.93
CNG	0.00	0.00	0.00	0.00
Diesel	3.20	504.05	0.30	47.45
LPG	0.00	0.01	0.00	0.00

Table C-1: Metro-East NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Aircraft				
Air Taxi	0.01	2.28	0.01	2.93
APUs	0.00	0.40	0.00	0.03
Commercial	0.03	13.03	0.01	3.98
General Aviation	0.01	6.12	0.03	13.40
Military	0.00	0.67	0.02	6.03
Airport Service Equipment				
4-stroke	0.00	0.00	0.00	0.00
Diesel	0.00	0.36	0.00	0.03
LPG	0.00	0.00	0.00	0.00
Commercial Equipment				
2-stroke	0.00	0.49	0.04	13.08
4-stroke	0.07	26.69	0.25	77.59
CNG	0.01	2.82	0.00	1.56
Diesel	0.21	65.59	0.02	7.79
LPG	0.03	8.05	0.00	1.31
Commercial Marine Vessels	4.07	835.31	0.12	24.06
Construction and Mining Equipment				
CNG	0.00	0.01	0.00	0.00
LPG	0.00	1.15	0.00	0.22
Construction Equipment				
2-stroke	0.00	0.61	0.09	23.44
4-stroke	0.01	4.44	0.04	10.27
Diesel	2.35	625.49	0.30	78.70
Industrial Equipment				
2-stroke	0.00	0.00	0.00	0.03
4-stroke	0.01	1.83	0.01	2.17
CNG	0.01	3.75	0.01	1.96
Diesel	0.38	107.35	0.04	9.97
LPG	0.20	51.93	0.03	7.70

Table C-1: Metro-East NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Lawn and Garden Equipment				
2-stroke	0.03	6.19	0.73	224.26
4-stroke	0.26	59.38	1.14	250.15
Diesel	0.15	24.27	0.01	2.36
LPG	0.00	0.22	0.00	0.03
Locomotives				
Class I	1.78	647.91	0.08	29.87
Class II/III	0.04	15.09	0.00	0.70
Passenger	0.12	43.98	0.01	2.45
Yard	1.72	627.05	0.11	41.07
Logging Equipment				
2-stroke	0.00	0.02	0.00	0.74
4-stroke	0.00	0.05	0.00	0.14
Diesel	0.00	0.40	0.00	0.06
Railroad Equipment				
4-stroke	0.00	0.07	0.00	0.18
Diesel	0.02	5.34	0.00	0.90
LPG	0.00	0.01	0.00	0.00
Recreational Marine Vessels				
2-stroke	0.16	49.20	0.92	260.04
4-stroke	0.09	28.98	0.11	29.17
Diesel	0.11	32.87	0.01	1.81
Recreational Vehicles				
2-stroke	0.01	3.38	0.75	193.95
4-stroke	0.05	13.37	0.31	79.63
Diesel	0.01	1.94	0.00	0.44
LPG	0.00	0.13	0.00	0.03
Underground Mining Equipment				
Diesel	0.00	0.00	0.00	0.00
<b>Off-road Mobile Source Totals</b>	<b>15.16</b>	<b>3,827.33</b>	<b>5.57</b>	<b>1,461.03</b>

Table C-1: Metro-East NAA Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
<b>Totals</b>				
Point Source	11.57	3,119.65	9.72	3,057.04
Area Source	1.71	1,323.31	17.03	6,293.30
On-road Mobile	18.94	6,520.09	7.69	2,511.94
Off-road Mobile	15.16	3,827.33	5.57	1,461.03
<b>Total</b>	<b>47.39</b>	<b>14,790.38</b>	<b>40.01</b>	<b>13,323.31</b>

Appendix D

2017  
Attainment Area Emissions by Category

Table D-1: Attainment Area Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Point Sources</b>				
External Fuel Combustion				
Electric Generation				
Coal	97.47	26,797.96	3.92	1,117.05
Distillate Oil	0.04	0.36	0.00	0.00
Natural Gas	0.88	253.91	0.04	9.97
Industrial				
Coal	6.84	2,356.56	0.10	33.72
Distillate Oil	0.05	5.42	0.00	0.05
Natural Gas	7.81	2,315.55	0.43	127.49
Process Gas	0.05	14.27	0.00	1.42
Residual Oil	0.00	0.29	0.00	0.00
Other	0.04	53.56	0.01	3.76
Commercial/Institutional				
Coal	0.62	191.99	0.01	2.08
Distillate Oil	0.23	7.07	0.00	0.10
Natural Gas	1.72	560.03	0.08	23.97
Residual Oil	0.00	0.00	0.00	0.00
Other	0.04	0.59	0.00	0.01
Space Heating				
Natural Gas	0.03	40.93	0.00	2.25
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	7.38	107.89	0.30	4.33
Landfill Gas	1.20	293.91	0.47	42.24
Natural Gas	15.02	1,197.46	1.75	90.40

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	1.77	15.45	0.05	0.48
Distillate Oil	2.82	270.22	0.18	18.88
Natural Gas	37.90	5,831.21	2.58	417.32
Other	0.03	4.44	0.00	1.43
Commercial/Institutional				
Distillate Oil	2.43	40.82	0.09	1.66
Natural Gas	0.09	21.02	0.01	3.12
Other	0.01	0.48	0.00	0.05
Engine Testing				
Diesel	0.36	165.41	0.06	21.70
Jet Fuel	0.01	0.07	0.00	0.00
Other	0.03	0.82	0.01	1.27
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.04	13.02
Ammonia	7.38	79.66	0.14	45.85
Cellulosic Fiber	0.00	0.00	4.46	1,519.10
Fixed Roof Tanks	0.02	6.01	0.04	12.64
Ink			0.15	35.33
Nitric Acid	0.06	20.88		
Paint			0.39	121.31
Pharmaceuticals	0.00	1.29	0.02	3.23
Plastics	0.03	11.23	1.33	490.16
Polyethylene			0.03	10.25
Resins	0.00	0.00	0.02	5.18
Synthetic Organic Fiber			0.04	12.45
Synthetic Rubber			0.01	5.34
Urea			0.00	0.14
Varnish			0.02	3.93
Other	0.12	94.16	5.31	1,641.39
Fuel Combustion	0.36	98.11	0.10	33.55
Fugitives			0.86	300.40

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Food/Agriculture				
Bakeries	0.00	0.00	0.32	79.43
Beer			0.00	0.00
Biodiesel			0.02	4.47
Candy			0.43	120.62
Distilled Spirits	0.10	34.05	0.37	134.20
Ethanol	0.14	54.88	0.15	45.44
Feed Manufacturing	0.10	34.19	0.11	38.77
Grain Elevators	0.21	38.45	0.08	25.27
Milling	0.16	39.14	2.82	913.71
Smokehouses	0.00	0.02	0.04	12.18
Starch Manufacturing	0.35	127.73	0.03	11.68
Vegetable Oil			8.15	2,761.06
Other	0.64	214.52	7.54	2,480.07
Fuel Combustion	1.38	462.33	0.42	139.83
Fugitives			1.58	559.09
Primary Metal Production				
Aluminum			0.00	1.86
Ferroalloy	0.00	0.05	0.00	0.09
Steel	1.42	400.28	0.37	91.09
Other			0.00	0.15
Fuel Combustion	0.02	4.73	0.00	0.26
Secondary Metal Production				
Aluminum	0.00	0.51	0.02	4.99
Copper	0.00	0.32	0.03	5.78
Gray Iron	0.08	18.15	1.48	334.43
Heat Treating	0.03	6.32	0.10	31.28
Steel	0.01	3.66	0.04	10.08
Zinc	0.01	2.86	0.01	3.05
Other	0.00	0.00	0.30	57.95
Fuel Combustion	0.88	279.98	0.10	26.03

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Mineral Products				
Asphalt Manufacturing	1.35	102.61	1.17	91.44
Asphalt Roofing			0.17	42.30
Brick Manufacturing	0.05	10.25	0.01	3.19
Bulk Materials	0.06	20.00	0.00	1.13
Calcining	1.10	370.76	0.00	1.63
Cement Manufacturing	6.38	1,988.94	1.01	208.04
Glass Manufacturing	8.58	2,995.64	0.21	54.49
Lime Manufacturing	0.17	0.00	0.00	0.00
Sand/Gravel	0.22	80.93	0.02	5.56
Stone Quarrying			0.01	3.71
Other	0.68	162.65	0.80	195.31
Fuel Combustion	0.96	266.97	0.14	19.33
Fugitives			0.00	0.00
Petroleum Industry				
Cooling Towers			0.00	0.77
Desulfurization	0.03	11.52	0.05	20.35
FCCU	0.18	71.92	0.13	43.28
Flares	0.17	56.85	0.35	126.36
Process Heaters	2.14	756.89	0.18	60.86
Waste Water			0.04	15.32
Other	0.02	5.92	0.57	201.61
Fugitives			0.11	41.89
Paper and Wood Products				
Particleboard	0.01	0.84	0.00	0.28
Plywood			0.00	0.10
Pulpboard			0.00	1.09
Other			0.19	18.03
Fugitives			0.01	1.66

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Rubber and Plastic Products				
Plastic Foam			0.85	213.85
Plastic Products	0.00	1.44	0.41	132.98
Tire Manufacturing	0.00	0.00	1.12	370.71
Other			0.22	57.07
Fuel Combustion	0.00	0.47	0.00	0.03
Fabricated Metal Products				
Plating	0.01	4.80	0.05	15.44
Welding			0.00	0.79
Other	0.04	10.01	0.89	197.89
Fuel Combustion	0.30	98.66	0.02	5.92
Fugitives			0.00	0.25
Oil and Gas Production				
Crude Oil			0.16	57.28
Natural Gas	5.02	673.39	0.32	50.17
Other	0.00	2.61	0.02	39.17
Fuel Combustion	0.15	28.27	0.01	1.64
Fugitives			0.22	80.46
Miscellaneous Machinery	0.00	0.01	0.26	66.01
Electrical Equipment			0.01	7.10
Transportation Equipment			0.04	14.23
Health Services				
Crematories	0.02	4.36	0.00	0.33
Sterilizers			0.00	0.20
Process Cooling			0.12	44.69

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
In-Process Fuel Use				
Natural Gas	0.00	0.48	0.00	1.00
Process Gas	0.02	6.30	0.00	0.00
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.03	2.10	0.21	58.92
Fuel Combustion	0.04	1.56	0.00	5.74
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.29	79.69
Degreasing	0.00	0.15	0.36	88.92
Dry Cleaning			0.58	119.41
Other			0.00	0.18
Surface Coating Operations				
Adhesives			0.37	79.50
Aircraft			0.04	10.09
Automobiles	0.01	3.86	1.86	400.56
Coating (general)	0.00	0.50	2.08	535.26
Fabric			0.04	7.87
Flatwood Products			0.41	96.42
Large Appliances			0.02	4.27
Magnet Wire			0.01	1.14
Metal Cans	0.01	5.08	1.60	495.65
Metal Coils			0.09	21.54
Metal Furniture			0.00	0.67
Miscellaneous Metal Parts	0.00	0.16	2.67	720.66
Ovens	0.39	110.20	0.05	15.47
Paper	0.01	1.60	0.73	253.16
Plastic Parts	0.00	0.00	1.57	430.56
Steel Drums			0.09	30.54
Thinning Solvents			0.11	36.16
Wood Furniture			1.34	333.39

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other	0.00	0.15	0.24	55.41
Fuel Combustion	0.08	23.41	0.01	2.18
Fugitives			0.02	6.95
Petroleum Product Storage				
Fixed Roof Tanks			1.22	332.97
Floating Roof Tanks			2.04	593.87
Variable Vapor Space Tanks			0.07	25.34
Fugitives			0.14	50.47
Bulk Terminals/Plants				
Fixed Roof Tanks			0.33	123.93
Floating Roof Tanks			0.53	212.45
Losses	0.00	1.25	0.26	98.26
Variable Vapor Space Tanks			0.00	1.52
Printing/Publishing				
Digital			0.00	0.19
Flexographic			0.35	158.75
Letterpress			0.05	21.59
Lithographic			1.90	573.60
Rotogravure			0.81	356.80
Screen Printing			0.13	29.67
Petroleum Marketing/Transport				
Pipelines			0.01	1.75
Stage I			0.01	3.24
Stage II			0.04	10.95
Tank Cars			0.17	36.40
Transportation			0.00	0.00
Fugitives	0.00	0.05	0.12	44.55

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Organic Chemical Storage				
Fixed Roof Tanks			0.75	269.88
Floating Roof Tanks			0.14	22.48
Pressure Tanks			0.01	2.23
Organic Chemical Transport			0.23	54.31
Organic Solvent Evaporation				
Evaporation	0.00	0.00	0.16	57.22
Other			0.21	59.38
Fuel Combustion	0.00	0.80	0.00	1.59
Solid Waste Disposal				
Government				
Incineration	0.00	0.00	0.00	0.00
Landfills	0.64	223.27	0.70	233.91
Sewage Treatment	0.02	5.88	0.04	12.99
Industrial				
Incineration	0.01	2.09	0.00	0.28
Landfills	0.15	47.80	0.02	6.76
TSDFs			0.00	1.17
Other			0.01	3.04
Site Remediation				
Air Stripping			0.04	12.43
Soil Venting	0.00	0.00	0.00	0.79
Other			0.02	2.40
Commercial Incineration	0.07	12.71	0.00	0.42
<b>Point Source Total</b>	<b>227.52</b>	<b>50,751.34</b>	<b>82.81</b>	<b>23,900.02</b>

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Area Sources</b>				
Agricultural Field Burning	0.00	7.46	0.00	27.57
Agricultural Pesticide Application			90.84	21,769.03
Aircraft Refueling			3.05	914.11
Architectural Coating			17.28	4,833.37
Asphalt Paving				
Cutback			0.00	70.40
Emulsified			0.71	110.73
Automobile Refinishing			1.44	373.41
Commercial Cooking			0.41	149.39
Consumer Solvent Use			47.88	17,412.54
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.02	4.72
Forest Fires	0.02	136.49	0.27	2,348.92
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.07	113.94	0.00	1.94
Kerosene	0.00	0.56	0.00	0.01
LPG	0.00	0.03	0.00	0.00
Natural Gas	1.82	2,071.21	0.10	119.08
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.38	182.43	0.00	1.81
Kerosene	0.00	0.37	0.00	0.00
LPG	0.00	0.98	0.00	0.05
Natural Gas	3.99	2,331.83	0.21	123.22
Residual Oil	0.06	24.93	0.00	0.15
Wood	0.00	0.00	0.00	0.00

Table D-1: Attainment Area Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Fuel Combustion – Residential				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	15.39	0.00	0.60
Kerosene	0.00	3.49	0.00	0.14
LPG	0.65	1,066.20	0.03	41.38
Natural Gas	3.93	5,266.40	0.23	308.14
Wood				
Firelog	0.00	27.50	0.00	141.57
Fireplaces	0.00	81.05	0.00	1,018.41
Furnace	0.00	74.45	0.00	483.96
Hydronic Heater	0.00	65.40	0.00	2,448.94
Outdoor	0.00	11.03	0.00	80.15
Wood Stoves	0.00	93.96	0.00	1,109.29
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			2.61	887.27
Stage II				
Diesel			0.62	192.33
Gasoline			6.57	1,739.74
Storage Tank Breathing			3.03	1,031.35
Tank Truck Leaks			0.17	60.90
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			3.51	910.93
Incineration	1.47	534.96	0.96	350.87
Industrial Surface Coating				
Maintenance			4.80	1,245.78
Other Special Purpose			0.51	132.19
Marine Vessel Loading and Transport			2.09	657.20
Oil and Gas Production	23.16	8,420.36	66.54	24,194.63
Oil Exploration			8.28	3,010.65

Table D-1: Attainment Area Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Open Burning				
Land Clearing	0.76	138.30	1.76	320.85
Prescribed Burning	0.72	2,405.85	10.51	36,964.39
Residential Household Waste Yard Waste	1.88	681.83	2.68	972.75
Brush	0.00	14.35	0.00	54.54
Leaves	0.00	17.80	0.00	80.38
Pavement Marking			0.1	16.68
Portable Fuel Containers				
Commercial			1.38	345.47
Residential			6.13	1,533.56
Residential Grilling	3.04	49.43	3.13	68.75
Solvent Cleaning			12.13	3,813.40
Structure Fires	0.05	4.59	0.39	36.03
Waste Water Treatment – POTWs			0.23	83.02
<b>Area Source Totals</b>	<b>41.98</b>	<b>23,842.55</b>	<b>300.61</b>	<b>132,596.69</b>
<b>On-road Mobile Sources</b>				
Bus				
Intercity	0.95	323.59	0.05	17.20
School	2.76	943.27	0.38	123.65
Transit	1.14	387.21	0.09	27.26
Car	24.88	8620.19	25.19	8809.15
Motor Home	0.67	233.31	0.30	91.18
Motorcycle	1.02	247.89	2.75	696.60
Truck				
Combination Long Haul	52.29	18100.94	4.81	1557.43
Combination Short Haul	10.45	3585.29	0.51	171.20
Light Commercial	9.51	3171.61	6.23	2103.74
Passenger	33.39	11232.02	23.49	7881.20
Refuse	1.20	412.41	0.07	22.14
Single Unit Long Haul	0.73	247.04	0.13	42.83
Single Unit Short Haul	12.56	4245.08	2.76	860.05
<b>On-road Mobile Source Totals</b>	<b>151.56</b>	<b>51,749.85</b>	<b>66.77</b>	<b>22,403.64</b>

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
<b>Off-road Mobile Sources</b>				
Agricultural Equipment				
2-stroke	0.01	0.97	0.12	18.97
4-stroke	1.31	229.29	2.43	400.36
CNG	0.00	0.15	0.00	0.12
Diesel	140.67	22,132.30	13.24	2,083.50
LPG	0.00	0.49	0.00	0.10
Aircraft				
Air Taxi	0.14	63.14	0.09	38.77
APUs	0.02	8.63	0.00	0.91
Commercial	0.75	355.55	0.26	121.80
General Aviation	0.13	50.55	0.30	113.35
Military	0.00	1.51	0.04	13.53
Airport Service Equipment				
4-stroke	0.00	0.10	0.00	0.12
Diesel	0.03	12.31	0.00	1.20
LPG	0.00	0.09	0.00	0.01
Commercial Equipment				
2-stroke	0.02	5.80	0.50	155.37
4-stroke	0.87	331.70	3.15	936.29
CNG	0.11	33.45	0.06	18.54
Diesel	2.47	778.23	0.29	92.44
LPG	0.30	95.57	0.05	15.53
Commercial Marine Vessels	65.08	13,342.42	1.87	384.34
Construction and Mining Equipment				
CNG	0.00	0.03	0.00	0.02
LPG	0.03	6.87	0.00	1.30
Construction Equipment				
2-stroke	0.01	3.64	0.53	139.83
4-stroke	0.09	27.88	0.23	61.34
Diesel	14.00	3,732.33	1.76	469.58

Table D-1: Attainment Area Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Industrial Equipment				
2-stroke	0.00	0.02	0.00	0.40
4-stroke	0.08	24.23	0.12	30.16
CNG	0.17	45.75	0.09	23.89
Diesel	3.79	1,058.85	0.38	104.97
LPG	2.37	620.82	0.35	92.07
Lawn and Garden Equipment				
2-stroke	0.22	52.68	6.39	1,914.92
4-stroke	2.25	519.53	10.02	2,102.78
Diesel	1.31	218.07	0.13	21.24
LPG	0.01	1.97	0.00	0.28
Locomotives				
Class I	54.44	19,869.26	2.51	916.14
Class II/III	2.69	983.66	0.12	45.50
Commuter	1.30	339.37	0.07	17.32
Passenger	2.30	839.07	0.13	46.80
Yard	3.69	1,345.89	0.24	88.14
Logging Equipment				
2-stroke	0.00	0.79	0.11	35.34
4-stroke	0.01	2.28	0.02	6.82
Diesel	0.06	19.08	0.01	2.98
Railroad Equipment				
4-stroke	0.00	1.10	0.01	2.86
Diesel	0.28	82.17	0.05	13.78
LPG	0.00	0.08	0.00	0.02
Recreational Marine Vessels				
2-stroke	4.13	1,284.04	24.50	6,784.74
4-stroke	2.36	778.08	3.26	781.57
Diesel	2.76	857.99	0.15	47.27

Table D-1: Attainment Area Emissions (continued)

<b>Category</b>	<b>NOx (tpd)</b>	<b>NOx (tpy)</b>	<b>VOM (tpd)</b>	<b>VOM (tpy)</b>
Recreational Vehicles				
2-stroke	0.26	583.37	16.33	11,623.42
4-stroke	0.73	211.89	5.67	1,404.09
Diesel	0.15	37.89	0.03	8.60
LPG	0.01	2.48	0.00	0.54
Underground Mining Equipment				
Diesel	1.01	225.93	0.19	43.04
<b>Off-road Mobile Source Totals</b>	<b>312.42</b>	<b>71,219.33</b>	<b>95.82</b>	<b>31,227.00</b>
<b>Totals</b>				
<b>Point Source</b>	<b>227.52</b>	<b>50,751.34</b>	<b>82.81</b>	<b>23,900.02</b>
<b>Area Source</b>	<b>41.98</b>	<b>23,842.55</b>	<b>300.61</b>	<b>132,596.69</b>
<b>On-road Mobile</b>	<b>151.56</b>	<b>51,749.85</b>	<b>66.77</b>	<b>22,403.64</b>
<b>Off-road Mobile</b>	<b>312.42</b>	<b>71,219.33</b>	<b>95.82</b>	<b>31,227.00</b>
<b>Total</b>	<b>733.48</b>	<b>197,563.07</b>	<b>546.01</b>	<b>210,127.34</b>

Appendix E

2017  
County Level Emissions

Table E-1: County Level NOx Emissions

County	Point	Area	On-road	Off-road	Total
Adams	1.13 216.66	0.27 235.06	1.92 656.03	4.50 954.69	7.81 2,062.45
Alexander	0.09 26.98	0.02 23.36	0.41 137.74	8.59 1,826.98	9.11 2,015.05
Bond	0.03 8.84	0.15 93.94	1.04 351.60	1.66 384.95	2.86 839.33
Boone	0.24 83.81	0.39 220.59	1.85 631.41	1.44 356.69	3.92 1,292.50
Brown	0.01 0.01	0.08 47.56	0.21 71.70	1.12 211.19	1.42 330.47
Bureau	1.74 39.81	0.17 139.86	1.75 595.53	5.55 1,246.54	9.21 2,021.74
Calhoun	0.00 0.75	0.02 32.95	0.15 50.75	4.58 9,733.86	4.76 1,058.32
Carroll	0.07 24.43	0.07 67.15	0.52 178.63	4.02 1,165.76	4.68 1,435.97
Cass	0.11 34.29	0.08 77.36	0.42 143.98	2.55 525.88	3.15 781.51
Champaign	3.31 637.79	0.68 543.27	5.93 2,022.75	7.10 1,700.24	17.02 4,904.05
Christian	6.50 1,723.56	0.40 206.93	1.21 413.82	3.19 629.15	11.31 2,973.46
Clark	0.69 7.01	0.85 340.13	1.27 430.22	2.10 445.73	4.90 1,223.09
Clay	0.63 11.09	1.45 567.61	0.59 200.51	1.60 310.94	4.27 1,090.16
Clinton	3.09 490.91	0.56 249.78	1.38 470.11	2.50 573.45	7.53 1,784.24
Coles	0.37 61.61	0.29 202.59	1.89 642.85	2.28 496.91	4.83 1,403.96
Cook	28.01 4,347.27	18.29 16,078.01	96.86 33,589.66	76.23 23,776.53	219.39 77,791.47
Crawford	4.69 1,773.75	2.49 947.39	0.68 232.27	1.34 240.72	9.20 3,194.13
Cumberland	0.06 0.91	0.13 81.83	1.10 372.47	1.51 348.45	2.80 803.66
DeKalb	0.28 148.49	0.35 217.69	2.98 1,020.35	4.56 1,154.84	8.18 2,541.37
DeWitt	0.40 51.75	0.11 91.91	0.72 244.10	1.45 257.51	2.68 645.27
Douglas	14.26 1,563.46	0.18 97.03	0.96 325.98	2.43 579.12	17.83 2,565.60
DuPage	5.81 664.94	5.41 3,906.44	24.11 8,526.57	15.29 4,334.15	50.62 17,432.09
Edgar	0.23 16.67	0.29 151.33	0.66 223.57	2.39 423.78	3.56 815.34
Edwards	0.01 3.44	0.88 349.21	0.29 98.07	0.77 148.19	1.95 598.90

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Effingham	0.20	0.65	2.42	2.85	6.13
	20.63	315.30	822.80	707.36	1,866.09
Fayette	2.43	1.83	1.55	2.71	8.52
	177.29	765.54	525.45	580.07	2,048.35
Ford	0.97	0.05	0.54	2.07	3.63
	148.11	44.07	182.73	379.91	754.82
Franklin	0.01	0.94	1.87	2.04	4.86
	3.93	422.16	635.13	547.55	1,608.76
Fulton	5.73	0.16	1.16	4.25	11.30
	1,488.78	158.70	396.80	899.28	2,943.56
Gallatin	0.00	0.73	0.27	0.91	1.91
	0.00	282.36	91.85	159.14	533.34
Greene		0.05	0.46	3.19	3.70
		140.19	156.40	610.10	906.70
Grundy	4.03	0.20	2.20	4.92	11.34
	1,255.87	148.44	754.61	1,172.95	3,331.87
Hamilton	0.01	0.63	0.33	1.25	2.23
	0.20	253.53	112.56	218.24	584.54
Hancock	0.02	0.07	0.74	4.76	5.60
	1.18	77.02	252.15	1,012.74	1,343.10
Hardin	0.02	0.02	0.17	0.99	1.19
	4.70	35.92	56.13	204.22	300.97
Henderson	0.00	0.07	0.43	3.22	3.73
	0.00	39.74	146.05	950.90	1,136.69
Henry	6.00	0.21	2.37	3.90	12.48
	1,169.36	163.59	808.67	833.16	2,974.78
Iroquois	0.18	0.11	1.65	6.46	8.40
	27.77	90.21	561.28	1,483.00	2,162.27
Jackson	1.15	0.25	1.82	5.73	8.95
	166.63	191.91	618.16	1,429.90	2,406.60
Jasper	4.80	0.73	0.52	1.68	7.72
	1,537.92	301.18	175.39	291.88	2,306.38
Jefferson	0.33	1.01	2.49	2.83	6.64
	55.39	474.07	842.80	755.31	2,127.57
Jersey		0.10	0.74	2.74	3.57
		71.69	255.55	550.77	878.02
JoDaviess	8.57	0.13	0.80	4.30	13.81
	407.21	92.58	275.21	1,257.31	2,032.31
Johnson	0.10	0.04	0.86	0.63	1.63
	29.21	47.28	291.19	169.23	536.91
Kane	3.95	2.45	11.97	10.11	28.47
	400.69	1,800.68	4,232.85	2,681.30	9,115.52
Kankakee	5.36	0.39	3.33	4.34	13.41
	717.55	317.00	1,138.90	1,081.96	3,255.39
Kendall	4.95	0.44	2.48	2.64	10.51
	584.68	295.03	865.14	669.04	2,413.88
Knox	0.10	0.16	1.90	6.47	8.62
	26.01	173.61	647.81	1,912.78	2,760.21

Table E-1: County Level NOx Emissions (continued)

<b>County</b>	<b>Point</b>	<b>Area</b>	<b>On-road</b>	<b>Off-road</b>	<b>Total</b>
Lake	11.25 1,819.33	4.02 2,783.26	17.14 6,057.95	14.94 4,012.17	47.36 14,672.72
LaSalle	8.19 2,425.23	0.39 325.04	4.46 1,520.60	9.25 2,119.96	22.29 6,390.84
Lawrence	0.05 5.46	1.95 769.40	0.60 205.06	1.23 209.85	3.83 1,189.77
Lee	3.57 564.94	0.22 192.66	1.90 644.70	4.19 1,073.61	9.88 2,475.91
Livingston	1.42 263.79	0.13 126.98	1.71 582.60	5.03 996.83	8.29 1,970.20
Logan	1.39 455.66	03.11 96.46	1.66 562.45	2.65 500.51	5.80 1,615.07
McDonough	0.67 72.83	0.12 92.28	0.92 314.20	2.76 634.52	4.47 1,113.83
McHenry	1.63 261.63	1.31 989.18	7.58 2,633.82	7.04 1,757.02	17.56 5,641.64
McLean	2.04 239.03	0.54 442.42	5.70 1,947.28	6.48 1,359.47	14.76 3,988.19
Macon	13.57 4,643.84	1.03 592.19	3.51 1,197.76	4.16 1,035.54	22.27 7,469.33
Macoupin	0.03 6.53	0.24 231.78	1.59 542.83	3.52 764.95	5.38 1,546.10
Madison	10.15 2,767.62	1.01 726.87	9.76 3,361.70	8.39 2,097.39	29.31 8,953.58
Marion	0.20 23.04	2.73 1,119.96	1.77 602.44	2.62 692.38	7.32 2,437.82
Marshall	0.09 71.95	0.06 57.46	0.64 219.33	3.55 880.88	4.34 1,229.62
Mason	4.07 1,249.17	0.06 64.40	0.44 151.80	3.87 777.84	8.45 2,243.21
Massac	12.93 3,331.88	0.05 45.45	0.78 263.39	0.91 215.67	14.67 3,856.40
Menard		0.05 55.98	0.37 127.42	1.01 187.33	1.44 370.73
Mercer	0.00 0.50	0.08 98.25	0.51 173.80	2.52 461.38	3.11 733.93
Monroe	0.54 5.14	0.21 118.14	1.25 432.10	6.43 1,426.67	8.44 1,982.06
Montgomery	7.98 2,492.44	0.16 120.15	1.77 599.99	3.11 687.44	13.01 3,900.02
Morgan	2.87 273.51	0.20 140.43	1.29 438.08	2.93 656.93	7.27 1,508.95
Moultrie	0.40 4.12	0.16 87.37	0.59 200.84	1.69 366.27	2.84 658.59
Ogle	3.97 310.69	0.22 226.73	2.38 809.13	4.58 1,223.94	11.15 2,570.49
Peoria	12.02 3,207.41	0.60 545.07	5.65 1,933.43	7.46 1,892.49	25.73 7,578.39

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Perry	0.53	0.09	0.73	1.58	2.93
	80.35	112.51	249.48	358.43	800.76
Piatt	0.92	0.07	0.82	2.19	4.00
	526.85	49.04	277.69	453.75	1,307.33
Pike	0.98	0.11	1.03	5.70	7.82
	82.11	118.59	348.25	1186.44	1,735.39
Pope		0.02	0.18	2.74	2.94
		72.08	59.64	576.21	707.93
Pulaski	0.07	0.05	0.43	0.70	1.25
	20.22	25.51	145.91	162.73	354.37
Putnam	5.47	0.03	0.22	2.22	7.94
	1,609.42	23.08	76.37	460.89	2,169.76
Randolph	11.62	0.23	1.06	8.28	21.18
	3,261.56	189.17	362.67	1846.96	5,660.35
Richland	0.02	0.94	0.62	1.33	2.90
	2.55	388.60	209.62	225.41	826.18
Rock Island	2.10	0.61	4.21	4.65	11.57
	235.86	535.69	1,442.82	1068.90	3,283.26
St. Clair	1.42	0.71	9.18	6.88	18.19
	352.02	596.44	3,158.39	1770.42	5,877.27
Saline	0.06	0.19	0.96	1.24	2.45
	7.72	148.74	325.30	258.02	739.78
Sangamon	7.80	0.87	7.14	5.28	21.09
	1,327.46	683.80	2,435.23	212.18	5,658.68
Schuyler	0.02	0.03	0.31	2.36	2.73
	0.02	48.29	107.40	486.31	642.03
Scott	0.55	0.04	0.32	1.74	2.65
	18.27	34.41	107.75	363.21	523.64
Shelby	1.35	0.15	0.95	3.05	5.50
	102.81	125.68	322.01	610.61	1,161.12
Stark		0.04	0.24	1.10	1.38
		30.02	83.64	180.78	294.45
Stephenson	0.34	0.17	1.43	2.23	4.17
	109.15	169.31	489.37	467.93	1,235.75
Tazewell	16.41	0.56	4.35	4.98	26.30
	4,044.02	392.24	1,487.40	1,035.56	6,959.22
Union	0.24	0.08	0.88	4.43	5.63
	55.20	117.83	298.93	1,024.46	1,496.42
Vermilion	1.45	0.25	2.56	5.08	9.34
	546.66	214.75	874.24	1,236.12	2,871.77
Wabash		1.04	0.37	0.93	2.34
		390.44	124.72	190.89	706.05
Warren	0.23	0.07	0.75	3.85	4.89
	56.65	52.32	255.94	1,017.83	1,382.74
Washington	12.85	0.51	1.30	2.54	17.20
	3,777.07	262.06	441.12	515.55	4,995.79
Wayne	0.13	1.30	0.99	2.03	4.45
	18.43	530.21	337.29	390.23	1,276.16

Table E-1: County Level NOx Emissions (continued)

<b>County</b>	<b>Point</b>	<b>Area</b>	<b>On-road</b>	<b>Off-road</b>	<b>Total</b>
White	0.88	2.81	0.79	1.77	6.25
	23.30	1,053.25	268.53	316.53	1,661.62
Whiteside	1.40	0.36	1.87	4.96	8.59
	218.15	285.04	639.93	1,255.64	2,398.76
Will	21.88	1.88	18.25	16.78	58.79
	3,098.53	1,746.07	6,309.72	4,571.34	15,725.66
Williamson	3.39	0.50	2.79	1.33	8.02
	950.76	279.91	949.30	370.61	2,550.58
Winnebago	2.37	1.42	8.45	4.06	16.30
	313.66	1,108.03	2,891.25	1,106.38	5,419.31
Woodford	0.04	0.22	1.50	3.13	4.89
	6.16	148.38	512.91	602.45	1,269.89

Top value has units of tons/day

Bottom value has units of tons/year

Table E-2: County Level VOM Emissions

County	Point	Area	On-road	Off-road	Total
Adams	3.14 989.33	3.38 1,702.38	1.02 328.66	1.94 487.44	9.48 3,507.81
Alexander	1.10 310.87	0.40 252.01	0.16 50.14	1.24 313.93	2.90 926.94
Bond	0.08 23.13	1.43 709.83	0.38 120.01	0.53 130.60	2.42 983.57
Boone	1.75 371.37	2.05 832.44	0.81 279.38	0.67 895.47	5.27 2,378.66
Brown	0.00 0.00	0.71 419.84	0.10 32.87	0.17 38.18	0.99 490.88
Bureau	0.50 25.03	2.98 1,266.97	0.66 223.31	1.02 237.97	5.16 1,753.28
Calhoun	0.00 0.11	0.59 469.22	0.09 29.56	1.47 388.10	2.15 886.98
Carroll	0.03 9.05	1.38 678.95	0.28 95.92	1.79 2,486.82	3.47 3,270.75
Cass	0.10 28.70	1.06 632.76	0.23 73.75	0.78 193.70	2.17 928.92
Champaign	1.33 391.34	7.63 2,697.28	2.45 839.55	1.85 448.80	13.26 4,376.97
Christian	1.33 421.21	3.43 1,133.34	0.62 199.68	0.94 222.91	6.32 1,977.14
Clark	0.44 121.52	4.51 1,574.07	0.45 141.59	0.43 100.52	5.83 1,937.69
Clay	0.33 76.06	5.51 2,113.22	0.28 89.33	0.68 162.48	6.79 2,441.10
Clinton	0.26 48.52	3.35 1,113.78	0.61 195.73	1.90 492.67	6.12 1,850.71
Coles	1.61 513.35	2.80 1,118.49	0.81 258.29	0.50 119.36	5.71 2,009.49
Cook	25.00 6,481.85	131.90 44,973.30	44.80 16,099.08	37.33 10,317.52	239.03 77,871.75
Crawford	3.08 963.14	9.10 3,451.52	0.37 119.92	0.34 76.87	12.89 4,611.46
Cumberland	0.17 31.85	1.21 653.38	0.34 107.19	0.24 53.75	1.96 846.19
DeKalb	0.54 135.67	4.35 1,734.33	1.34 463.69	0.97 598.79	7.20 2,932.48
DeWitt	0.68 176.79	1.55 852.32	0.30 102.77	0.73 179.90	3.27 1,311.78
Douglas	1.74 465.45	2.28 562.95	0.38 122.42	0.33 74.44	4.72 1,225.26
DuPage	3.73 992.41	29.16 10,589.47	10.75 3,962.57	12.32 3,129.34	55.95 18,673.79
Edgar	0.44 105.88	2.33 777.20	0.33 107.61	0.38 76.55	3.48 1,067.23
Edwards	0.03 7.31	3.05 1,180.57	0.14 45.28	0.14 30.16	3.35 1,263.31

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Effingham	0.97	3.72	0.88	0.72	6.29
	280.18	1,340.66	278.98	173.40	2,073.22
Fayette	0.23	7.86	0.54	0.94	9.58
	21.68	3,726.43	169.35	231.11	4,148.57
Ford	2.45	1.62	0.24	0.30	4.61
	768.87	612.52	82.76	59.18	1,523.33
Franklin	0.07	4.13	0.80	1.35	6.35
	20.39	2,035.92	255.66	356.64	2,668.61
Fulton	0.18	2.02	0.60	1.28	4.07
	42.90	1,526.93	206.51	322.42	2,098.77
Gallatin	0.00	3.32	0.12	0.34	3.78
	0.00	1,281.64	38.91	79.84	1,400.38
Greene	0.00	1.39	0.26	0.64	2.30
	0.24	2,277.42	83.31	148.71	2,509.68
Grundy	1.81	2.34	0.83	1.29	6.26
	537.03	841.45	285.93	332.04	1,996.45
Hamilton	0.00	3.78	0.17	0.21	4.16
	0.83	1,518.56	53.93	43.35	1,616.67
Hancock	0.02	2.08	0.37	1.21	3.68
	4.04	982.00	127.30	302.76	1,416.10
Hardin	0.01	0.41	0.08	0.39	0.89
	2.05	374.71	26.75	99.48	502.99
Henderson	0.00	1.69	0.16	0.89	2.75
	0.00	601.21	55.38	239.14	895.72
Henry	1.25	3.78	0.94	1.04	7.00
	284.08	1,443.73	319.84	246.01	2,293.65
Iroquois	1.61	3.54	0.64	1.37	7.17
	512.21	1,170.87	216.25	318.33	2,217.66
Jackson	0.22	2.40	0.87	1.37	4.85
	41.67	1,579.38	278.92	361.01	2,260.99
Jasper	0.39	3.66	0.24	0.37	4.65
	120.58	1,561.82	75.92	81.40	1,839.71
Jefferson	0.91	5.01	0.86	1.18	7.96
	279.66	2,275.67	272.96	305.30	3,133.58
Jersey	0.03	1.21	0.37	0.75	2.36
	10.34	584.91	122.67	189.41	907.33
JoDaviess	0.25	1.70	0.39	1.56	3.90
	75.14	742.39	134.99	1,900.31	2,852.82
Johnson	0.06	0.52	0.30	0.62	1.49
	2.30	466.80	93.96	158.26	721.32
Kane	3.00	15.52	5.78	6.30	30.60
	848.88	5,855.93	2,133.21	1,558.71	10,396.73
Kankakee	2.68	5.07	1.54	1.21	10.51
	757.39	1,895.93	534.74	600.14	3,788.20
Kendall	0.70	3.66	1.28	1.67	7.31
	156.41	1,286.91	460.62	945.21	2,849.15
Knox	0.31	2.70	0.84	1.06	4.91
	84.14	1,367.36	288.90	275.49	2,015.89

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Lake	1.88 393.46	20.08 7,589.43	7.82 2,933.88	12.66 3,175.43	42.44 14,092.20
LaSalle	3.33 1,022.62	5.69 1,982.45	1.84 629.80	2.90 722.49	13.77 4,357.36
Lawrence	0.20 51.94	6.77 2,798.55	0.29 93.76	0.30 67.70	7.57 3,011.96
Lee	1.98 420.25	2.79 1,599.96	0.70 235.77	1.23 1,230.11	6.70 3,486.09
Livingston	1.13 328.37	3.83 1,288.93	0.64 218.27	0.69 142.61	6.29 1,978.19
Logan	0.09 25.55	2.42 921.01	0.57 190.83	0.41 85.66	3.48 1,223.05
McDonough	0.35 94.31	2.00 910.67	0.42 144.19	0.38 87.01	3.16 1,236.18
McHenry	0.99 226.10	8.88 3,978.29	3.76 1,341.44	3.98 1,002.35	17.60 6,548.19
McLean	1.59 456.35	7.42 2,682.26	2.33 803.47	1.98 468.78	13.32 4,410.85
Macon	11.60 4,148.95	5.96 2,174.42	1.70 547.32	1.28 319.36	20.54 7,190.05
Macoupin	0.02 4.79	3.11 2,368.85	0.85 275.64	0.90 213.26	4.87 2,862.55
Madison	7.63 2,470.39	9.25 3,410.92	3.94 1,287.09	3.31 864.64	24.13 8,033.04
Marion	2.29 644.14	9.91 4,404.50	0.80 257.25	0.75 191.03	13.75 5,496.92
Marshall	1.08 379.80	1.13 492.06	0.26 86.73	0.76 197.52	3.22 1,156.11
Mason	0.20 63.30	1.36 815.29	0.26 91.10	1.47 375.57	3.29 1,345.25
Massac	0.39 103.92	0.61 397.97	0.31 97.52	0.28 67.39	1.58 666.81
Menard	0.05 16.69	1.00 601.64	0.21 68.61	0.42 98.79	1.67 785.73
Mercer	0.01 2.93	1.58 1,076.04	0.28 97.16	0.76 183.87	2.64 1,360.00
Monroe	0.07 8.88	2.38 851.84	0.55 179.30	0.83 209.86	3.82 1,249.88
Montgomery	0.75 227.92	2.13 960.77	0.66 208.51	0.90 216.39	4.44 1,613.59
Morgan	0.22 48.94	2.44 922.09	0.59 187.93	0.79 188.90	4.04 1,347.86
Moultrie	1.26 305.68	1.18 368.83	0.25 81.63	0.61 151.29	3.30 907.43
Ogle	2.23 486.25	3.18 1,935.93	0.95 325.31	2.48 1,253.55	8.83 4,001.04
Peoria	3.55 933.79	6.17 2,432.23	2.58 892.46	2.89 731.65	15.18 4,990.13

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Perry	0.08	1.25	0.35	0.49	2.17
	10.15	1,267.45	113.95	120.40	1,511.95
Piatt	0.15	1.66	0.32	0.29	2.42
	32.78	530.90	108.64	60.23	732.55
Pike	0.29	2.50	0.40	1.64	4.83
	57.03	1,761.96	126.85	409.74	2,355.58
Pope		0.38	0.08	0.28	0.74
		882.87	26.33	69.72	978.91
Pulaski	0.02	0.79	0.15	0.21	1.17
	6.73	294.73	48.50	51.77	401.74
Putnam	0.62	0.47	0.10	0.82	2.02
	188.61	223.78	35.48	211.90	659.78
Randolph	0.88	2.02	0.57	1.55	5.02
	255.06	1624.49	185.12	394.12	2,458.79
Richland	0.03	4.08	0.32	0.31	4.74
	9.04	1,683.58	101.60	70.04	1,864.27
Rock Island	1.99	5.43	2.02	2.94	12.39
	498.41	1,807.75	703.41	764.07	3,773.64
St. Clair	2.09	7.79	3.75	2.27	15.89
	586.64	2,882.38	1,224.84	598.27	5,292.13
Saline	0.06	1.39	0.45	0.41	2.32
	9.06	1,112.08	145.84	101.57	1,368.55
Sangamon	0.72	7.13	3.05	3.52	14.42
	161.75	2,537.05	980.67	868.91	4,548.39
Schuyler	0.02	0.80	0.14	0.35	1.30
	5.68	618.35	47.96	81.95	753.94
Scott	0.02	0.58	0.12	0.22	0.94
	1.39	309.80	38.40	51.16	400.76
Shelby	0.21	2.33	0.44	1.04	4.03
	50.90	1,119.57	140.57	250.60	1,561.63
Stark	0.03	1.35	0.11	0.17	1.65
	10.24	488.60	38.33	31.41	568.58
Stephenson	0.43	2.39	0.73	0.61	4.15
	130.56	1,110.77	252.09	833.65	2,327.07
Tazewell	2.10	5.23	2.00	2.16	11.50
	661.25	2,028.93	691.93	531.07	3,913.18
Union	0.05	1.14	0.37	0.71	2.26
	7.19	1,477.37	117.98	179.95	1,782.50
Vermilion	6.48	3.23	1.22	1.29	12.21
	1,992.41	1,351.14	419.19	314.22	4,076.95
Wabash	0.02	5.08	0.20	0.34	5.64
	5.87	1,668.18	65.94	84.13	1,824.11
Warren	0.06	1.41	0.31	0.40	2.17
	14.78	515.79	104.43	93.23	728.23
Washington	0.47	3.07	0.43	0.51	4.48
	131.12	1,320.75	135.38	111.50	1,698.76
Wayne	0.03	5.56	0.40	0.56	6.55
	8.30	2,509.82	126.72	128.60	2,773.45

Table E-2: County Level VOM Emissions (continued)

<b>County</b>	<b>Point</b>	<b>Area</b>	<b>On-road</b>	<b>Off-road</b>	<b>Total</b>
White	0.20	10.48	0.33	0.58	11.58
	44.02	3,748.74	106.51	135.46	4,034.73
Whiteside	0.27	3.30	0.91	1.33	5.81
	63.37	1,877.85	315.47	336.46	2,593.13
Will	9.00	19.20	7.77	6.86	42.83
	2,548.45	7,134.88	2,753.53	1,757.21	14,194.07
Williamson	0.70	3.32	1.15	1.85	7.02
	228.30	1,611.34	366.82	490.78	2,697.24
Winnebago	2.27	8.97	4.02	3.08	18.34
	593.74	3,535.38	1,396.70	818.66	6,344.49
Woodford	0.17	2.62	0.60	1.48	4.87
	43.18	961.53	205.79	367.16	1,577.66

Top value has units of tons/day  
 Bottom value has units of tons/year

# Appendix F

## Area Source Emission Factors And Growth Factors

Table F-1: Area Source Emission Factors

Area Source Category	NOx Emission Factor	VOM Emission Factor	Units
Agricultural field burning			
Corn	14.50	58.19	lb/acre
Corn/soybeans	13.73	46.41	lb/acre
Corn/wheat	11.41	45.33	lb/acre
Cotton	9.76	26.18	lb/acre
Cotton/soybeans	10.82	30.26	lb/acre
Fallow	9.15	30.20	lb/acre
Lentils	12.34	40.73	lb/acre
Pasture	6.97	39.12	lb/acre
Rice	14.02	41.08	lb/acre
Soybeans	11.86	34.64	lb/acre
Sugar cane	18.72	11.36	lb/acre
Total/other	6.97	29.83	lb/acre
Wheat	7.67	30.18	lb/acre
Wheat/cotton	8.90	28.43	lb/acre
Wheat/soybeans	9.75	32.70	lb/acre
Architectural coating		2.34	lb/person
Asphalt paving – cutback		88	lb/bbl
Asphalt paving – emulsion		9.2	lb/bbl
Automobile refinishing		94.69	lb/employee
Commercial cooking		72.32	lb/1000 persons
Consumer solvent use		8.43	lb/person
Forest fires	22.41	49.16	lb/acre
Fuel Combustion – Commercial/Institutional			
Distillate oil	20	0.34	lb/1000 gallons
Kerosene	19.29	0.33	lb/1000 gallons
LPG	9.48	0.52	lb/1000 gallons
Natural gas	100	5.5	lb/million ft <sup>3</sup>
Residual oil	55	1.13	lb/1000 gallons

Table F-1: Area Source Emission Factors (continued)

Area Source Category	NOx Emission Factor	VOM Emission Factor	Units
Fuel combustion – Industrial			
Distillate oil	20	0.2	lb/100 gallons
Natural gas	100	5.5	lb/million ft <sup>3</sup>
Residual oil	47	0.28	lb/1000 gallons
Fuel combustion – Residential			
Coal	9.1	10	lb/ton
Distillate oil	18	0.7	lb/1000 gallons
Kerosene	17.4	0.68	lb/1000 gallons
LPG	13.4	0.52	lb/1000 gallons
Natural gas	94	5.5	lb/million ft <sup>3</sup>
Graphic arts		201	lb/employee
Incineration	0.26	0.17	lb/person
Industrial surface coating – maintenance		0.6	lb/person
Industrial surface coating – other special purpose		0.064	lb/person
Open burning			
Prescribed burning	20.14	44.19	lb/acre
Residential waste	6	8.56	lb/ton
Yard waste – brush	5	19	lb/ton
Yard waste – leaves	6.2	28	lb/ton
Pavement marking		0.29	lb/road-mile
Solvent cleaning		37	lb/employee
Structure fires	1.61	12.65	lb/fire
Waste water treatment - POTW		0.85	lb/million gallons

Table F-2: Area Source Growth Factors

Area Source Category	Growth factor from 2014 to 2017
Aircraft refueling – Stage I	LTOs
Aircraft refueling – Stage II	LTOs
Construction	
Residential	1.105
Roads	1.045
Gasoline marketing – gasoline storage tanks	Varies by county
Gasoline marketing – tank trucks	Varies by county
Marine vessel loading	1
Open burning – land clearing debris	1
Portable fuel containers – commercial	1.054
Portable fuel containers – residential	1.054



## Appendix G

Area Source  
Daily Adjustment Factors  
Seasonal Adjustment Factors  
Control Efficiencies

Table G-1: Area Source Daily Adjustment Factors, Seasonal Adjustment Factors and Control Efficiencies

Area Source Category	Daily Adjustment Factor	Seasonal Adjustment Factor	Control Efficiency (%)
Agricultural field burning	0	0	
Agricultural pesticide application	0.00321	1.3	
Architectural coating	0.00275	1.3	
Asphalt paving – cutback	0	0	
Asphalt paving – emulsion	0.00321	2	
Automobile refinishing	0.00385	1	Note 1
Commercial cooking	0.00275	1	
Consumer solvent use	0.00275	1	
Forest fires	0.00275	2.1	
Fuel combustion – commercial/institutional – distillate oil	Note 2	Note 2	
Fuel combustion – commercial/institutional – kerosene	Note 2	Note 2	
Fuel combustion – commercial/institutional – LPG	Note 2	Note 2	
Fuel combustion – commercial/institutional – natural gas	Note 2	Note 2	
Fuel combustion – commercial/institutional – residual oil	Note 2	Note 2	
Fuel combustion – industrial – distillate oil	Note 2	Note 2	
Fuel combustion – industrial – natural gas	Note 2	Note 2	
Fuel combustion – industrial – residual oil	Note 2	Note 2	
Fuel combustion – residential – coal	Note 2	Note 2	
Fuel combustion – residential – distillate oil	Note 2	Note 2	
Fuel combustion – residential – kerosene	Note 2	Note 2	
Fuel combustion – residential – LPG	Note 2	Note 2	
Fuel combustion – residential – natural gas	Note 2	Note 2	
Fuel combustion – residential – wood (all types)	0	0	
Graphic arts	0.00385	1	
Incineration	0.00275	1	
Industrial surface coating – maintenance	0.00385	1	
Industrial surface coating – other special purpose	0.00385	1	

**Table G-1: Area Source Daily Adjustment Factors, Seasonal Adjustment Factors and Control Efficiencies (continued)**

<b>Area Source Category</b>	<b>Daily Adjustment Factor</b>	<b>Seasonal Adjustment Factor</b>	<b>Control Efficiency (%)</b>
Open burning – land clearing	0.00366	1.5	
Open burning – prescribed burning	0	0	
Open burning – residential waste	0.00275	1	
Open burning – yard waste – brush	0	0	
Open burning – yard waste – leaves	0	0	
Pavement marking	0.00385	1.72	
Portable fuel containers – commercial	1	1	
Portable fuel containers – residential	1	1	
Solvent cleaning	0.00321	1	
Structure fires	Note 3	Note 3	
Waste water treatment – POTW	0.00275	1	

Notes:

1: 72% for nonattainment areas and 33% for attainment areas

2: Actual consumption data for June, July, and August was used so there is no need to convert annual data to peak ozone season. The daily consumption rate was the amount of fuel used in those three months divided by the number of days (92) in those months.

3: The actual number of fires for June, July, and August were used so there is no need to convert annual data to peak ozone season. The daily rate was the number of fires in those three months divided by the number of days (92) in those months.

## APPENDIX H

Nonattainment Township  
Surrogates and Apportionment

Table H-1: Nonattainment Township Surrogates and Apportionment

Surrogate	Category	Percent of County Value	
		Grundy County Townships	Kendall County Townships
Area	Agricultural Pesticide Application Forest Fires Prescribed Burning	13.00	12.00
Miles of Roadway	Asphalt Paving Pavement Markings	11.00	23.00
Miles of Track	Locomotives	20.0	19.0
Miles of Water	Commercial Marine Vessels Marine Vessel Loading and Transport	50.00	0.00
Population	Architectural Coating Automobile Refinishing Commercial Cooking Consumer Solvent Use Dry Cleaning Fuel Combustion Fuel Marketing Graphic Arts Incineration Industrial Coating On-road Mobile Open Burning Portable Fuel Containers POTWs Solvent Cleaning Structure Fires	29.4	44.3